January 31, 1957

# The IRON AGE

The National Metalworking Weekly

# THE REAL STORY ON STEEL INVENTORIES

A Special Survey Report P. 19

How To Get More For Your Aluminum Dollar P. 57

Digest of the Week P – 2

# THE MOST COMPLETE LINE OF LEADED STEELS

Copperweld offers the most complete line of leaded alloy and carbon steels available today. Leaded steels give you faster feeds and speeds, saving of tool costs, and finer finishes that often eliminate a final machining operation. Here's a partial list of some of the most popular leaded steels available through Copperweld:

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|---|---|---|
| Ledloy*A | A-4142 | A-5140 |
| C-1040 | A-4145 | A-5150 |
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| C-1045 | A-4150 | A-8622 |
| C-1050 | A-4620 | A-8640 |
| C-1137 | A-4640 | A-8642 |
| C-1141 | A-4720 | A-8645 |
| C-1146 | A-5046 | A-8647 |
| C-1153 | A-5117 | A-8650 |
| A-4140 | A-5120 | E-52100 |

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*Inland Ledloy License

ARISTOLOY STEELS

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Steel Division • Warren, Ohio

EXPORT: Copperweld Steel International Co.
225 Broadway, New York 7, N.Y.

# Something New in Piggyback

Shown here is a new semi-automatic hold-down device for securing highway trailers to flat cars in piggyback service. Developed by American Car and Foundry Division of ACF Industries in cooperation with the Pennsylvania Railroad and Rail-Trailer Company, this retractable trailer hitch moves up to brace the trailer in place, folds down flat to give clearance during loading.

ACF uses high-strength Mayari R plates to build this hitch, which is substantially stronger under impact than earlier types of braces. One man with a power tool can now secure a trailer in 2½ minutes, instead of the usual three-man crew requiring 5 minutes.

Because Mayari R has a higher yield point than carbon steels, it provides greater strength than carbon steel of the same section. Or it can be used in lighter sections to reduce deadweight. It has superior resistance to corrosion and abrasion, and good impact properties. It can be worked and welded as readily as other steels.

Catalog 353 contains detailed technical information about Mayari R, along with many interesting photographs and case histories covering a wide variety of applications. A copy will be sent you promptly upon request.

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On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

**Mayari R**...High-Strength, Corrosion-Resisting Steel

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

Jan. 31, 1957—Vol. 179, No. 5

The IRON AGE

# Digest of the Week in Metalworking

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**Chestnut and 56th Sts. Philadelphia 39, Pa.**

## NEWS DEVELOPMENTS

### ROADBUILDING EQUIPMENT MAKERS ARE READY P. 21

Frederick Salditt, vice president of Harnischfeger Corp., tells Senate subcommittee that the roadbuilding equipment industry will cut exports, increase output by 20 pct to meet the requirements of the federal highway program.

### MAINTENANCE COSTS SLASHED BY PROPER PLANNING P. 22

U. S. industry spent $12 billion for plant upkeep in 1956. This year's total may reach $13.2 billion. Reducing costs without causing production delays can only be done through proper planning, say experts.

### PUBLIC LIBRARIES ARE GEARED TO SERVE BUSINESS P. 24

Storehouses of valuable business and industrial information, today's libraries are planned with companies in mind. Larger ones have special business sections. Firms can take out company library cards.

### SOLAR FURNACES HARNESS SUN'S RAYS FOR INDUSTRY P. 25

Strange new devices are appearing in laboratories' back yards. They are solar furnaces. A symposium reveals that advances have been made in their design. A number already are being operated at research laboratories. Industrial applications are coming.

### HOME BUILDING IS CAUGHT IN CREDIT SQUEEZE P. 26

Builders see gloomy picture for 1957. New home building is caught between rising costs of materials and land and a tight money situation. Builders try to cut costs to hit lower income bracket with low cost homes.

◀

STABILITY is returning to the steel market. It's the result of increased capacity plus consumer assurance of steady, year-long production. This week's special report (P. 19) tells the real story of the recent "return to normalcy" in the steel market.

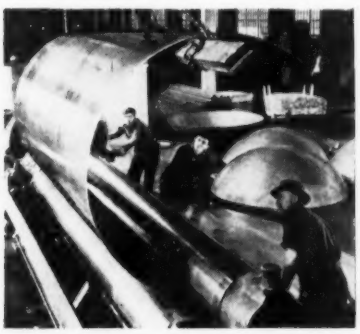
**PAPERWORK IS CUT DOWN BY PUNCHED CARDS** P. 28

Steel Div., Ford Motor Co., fought its way out from under an avalanche of time wasting paperwork by installing an information center featuring a punched card system. Estimated savings the first year, $150,000. It features some unique communications devices.

## FEATURE ARTICLES

**ALUMINUM: SELECTION IS YOUR MARGIN OF PROFIT** P. 57

Since aluminum lends itself to virtually every type of fabrication, you must pre-plan suitable methods for



heat treating, machining, forming, joining, and surface finishing. All of these decisions will affect your product's cost and performance. This report, Part I of No. 7 in a series, "How To Get More For Your Metalworking Dollar," offers the designer, engineer, and fabricator the latest facts on the types of aluminum available, where they are best used.

**WAYS TO GET THE MOST FROM ALUMINUM** P. 67

Aluminum is a readily workable metal. That, in part, accounts for its many uses. But using aluminum has one major hitch. You must use the right fabricating process for the alloy you've chosen. In general, all aluminum alloys can be satisfactorily machined when the correct methods are employed. But there is no single machining procedure that provides optimum results for all alloys. Part II, No. 7 in the series "How To Get More For Your Metalworking Dollar," tells how to avoid getting sidetracked when fabricating aluminum.

**CENTRAL LUBRICATION SYSTEMS GAIN GROUND** P. 23

Makers of central systems believe they have reached only 25 pct of their market potential. Trend to big industrial equipment helps overcome high installation cost. Steel mills are big users and can point to big cost savings from central systems.

## MARKETS AND PRICES

**AUTO SALES BUCK SEASONAL TREND** P. 36

Even though winter sales are traditionally slow, dealers are selling new cars at a rate of 500,000 a month. Dealers' new car inventories average 33 days supply, slightly higher than normal. Ford, Dodge, and DeSoto production is going especially well.

**HOW LONG WILL TIGHT MONEY POLICY LAST?** P. 41

President Eisenhower has something up his financial sleeve. He wants Congress to re-examine the nation's financial system. It could mean that the administration might abandon its tight money policy, in the not-to-distant future.

**HOW MUCH EXPANSION IN THE NORTHWEST?** P. 43

With large-scale projects underway in the area, the big question asked is not will there be expansion, but how much. Shipyards, steel, aluminum, aircraft, and natural gas are among industries enlarging facilities.

**MACHINE BUILDERS CALM IN FACE OF SALES DIP** P. 45

The industry has some well-founded doubts that 1957 won't measure up to 1956 as far as new orders are concerned. The impending factors: inflation, automotive cutbacks, and credit curbs on capital goods spending. However, producers are finding solace.

**STEEL PESSIMISTS ARE PULLING IN HORNS** P. 103

Some of the pessimists are protesting that the steel business is not so bad, after all. They're not denying the soft spots. But they're pointing to the strong points, too. Automotive steel buyers are still a puzzling problem, however.

## NEXT WEEK:

**HOW TO CHOOSE A MANAGEMENT CONSULTANT**

As business becomes more complex, more firms feel the need of the services of a professional management consultant. Next week's special report by Eugene B. Mapel, tells how to go about choosing one.

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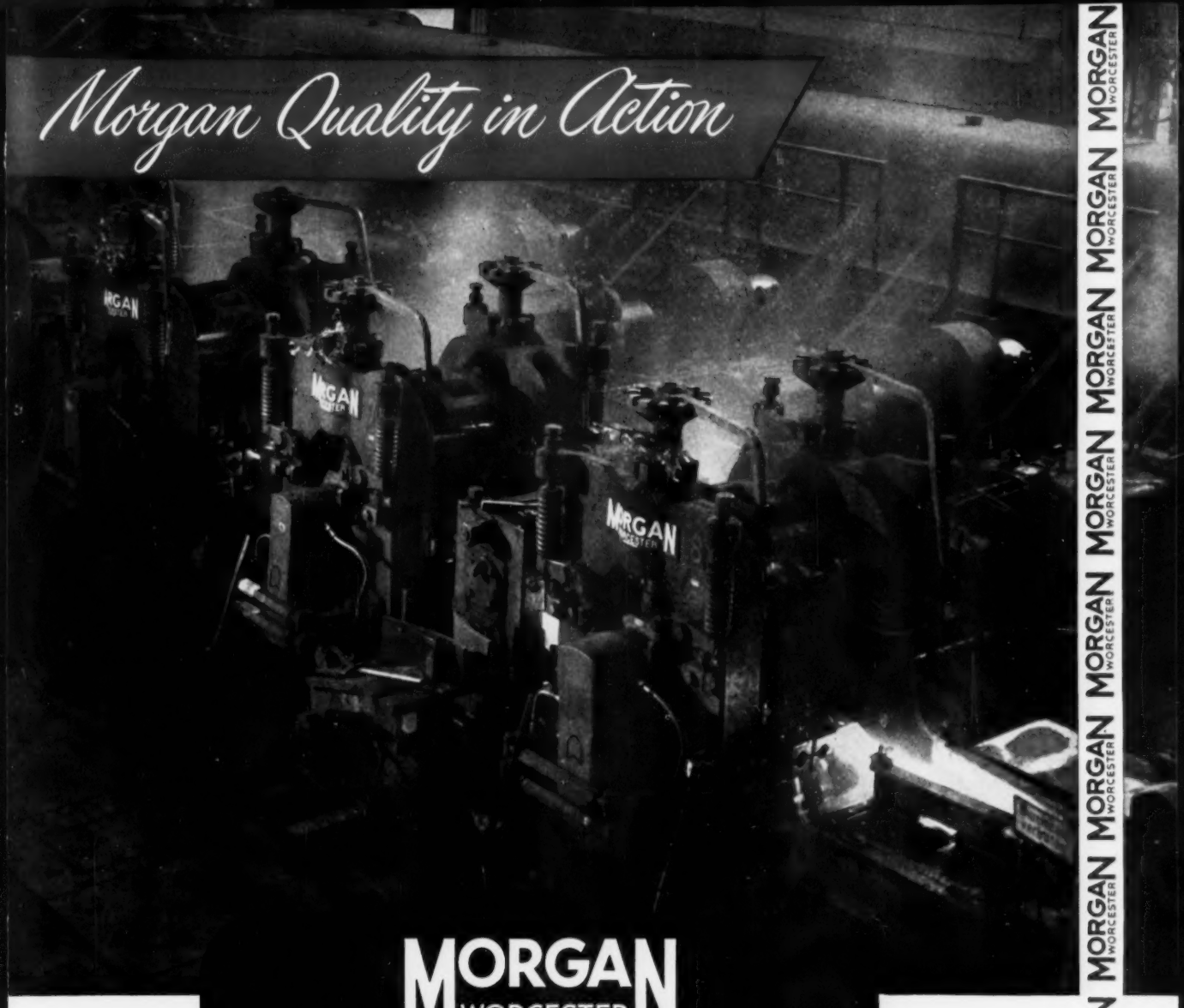

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MORGAN WORCESTER

## In Hotel Statler, New York City...

## ARMCO ZINCGRIP STEEL GUARDS CONDUITS WHERE MAINTENANCE MEN CAN'T GO

Production of conduits requires severe lock seaming, but the zinc coating on Armco ZINCGRIP Steel stays tight and unbroken. That's why conduits like this one are expected to last the life of the air conditioning system—even where inaccessible to maintenance men.

Miles of conduits and ductwork are required in the modern air conditioning system that serves 2,200 rooms of the giant hotel.

Conduits for the new air conditioning system in New York City's Hotel Statler are made of Armco ZINCGRIP® Steel. According to the project engineer in charge, this is why:

"The galvanized bond of Armco ZINCGRIP Steel is completely reliable. We can lock-seam without causing damage to the coating. This means that *conduits can be placed in inaccessible parts of the building* . . . in vertical rises between floors for example, without further attention for an indefinite period. *They'll last the life of the system itself.*"

And further . . .

"In those areas where conduits are exposed, their attractive appearance does not detract from the residential nature of the hotel."

### 20-YEAR RECORD

For more than 20 years, drawn and severely formed parts of many kinds of products have been made of Armco ZINCGRIP Steel at cost savings.

**The reasons:**

**1. No flaking or peeling of the patented hot-dip coating.**
**2. Elimination of finishing after fabrication.**
**3. Production advantages of ZINCGRIP coils.**

Many years of experience in hundreds of plants back up this fact: *Anything that can be done with sheet steel can be done with Armco* ZINCGRIP.

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Indexed in the Industrial Arts Index and the Engineering Index.

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# EDITORIAL

## There is Danger and Risk Ahead

◆ WHILE WE CHATTER about our domestic business outlook, the world picture looks worse than at any time since Korea. We pretend to know this. But do we?

The Red butchers are in trouble. And it isn't all due to overdoses of vodka. While they are on the spot they are not going to make it any easier for us. It is a grand slam for them. They will make it over the next few years or else.

Great Britain has lost much prestige because of Suez. It will take time for this wound to heal—if it ever does. She may let others take more responsibility in areas where she was once the king pin. That means more foreign aid than is now being talked about. As expected, we will pitch in.

France has her troubles too. Inflation is going at a pretty steady boil there. Much of her resources have gone for lost causes. She too needs help; more than it looked as if she would need. We won't live alone so the trend will be to bolster up our relations with France.

Russia does not need Middle East oil. But she will do everything she can to cause the West to lose it. If she succeeds, all hell could break loose. She knows this. The Arabs know it. We know it and we must do everything we can to balance the Reds' influence in the Middle East.

All this will cost money. It will cost materials too. When England and Europe—and the Middle East and Africa—recover from the oil shortage, the interrupted strong business trends in those areas will swell upward again. That also will affect substantially our industrial picture.

We have been writing checks on past defense appropriations. The bank balance is low. It must be raised not only during this year but in the next several years. There is no other way out.

From a practical standpoint of fighting for our very existence, we haven't seen anything yet. There is no relief in sight. The keys to our fate are not here alone. Some are in Europe, some in the Middle East and some in Moscow itself.

To think straight domestically we must think straight internationally. We can't do the one without the other!

Tom Campbell

EDITOR-IN-CHIEF

# good start

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**RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL**
Processed to meet special gauge tolerances and provide special finishes and physical properties . . . solves many fabrication, cost and performance problems.

In figuring production costs, a metal fabricator has the right to depend on good performance with the product of the strip steel supplier of his choice. To insure the performance needed to provide the best end-product cost, it sometimes pays to buy restricted specification cold rolled strip steel. Although the initial cost might be somewhat greater per ton of steel, many examples can be cited to illustrate the economy in such a practice when end-product costs are facts and not estimates.

Consider the case of the West Coast manufacturer who was purchasing coil stock (sold as cold rolled strip steel) for a forming operation where close gauge tolerance was not of greatest importance. (However, the drawing quality, because of chemistry, was not uniform and die costs and rejects were causing expensive down time and yield losses.) Switching to a **CMP** restricted specification strip, the manufacturer obtained a uniformity in coil after coil that eliminated these problems and provided an end product cost much below his former cost even though his initial steel costs were higher.

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## dear editor: *letters from readers*

### Ten Commandments

Sir:

I read your editorial "Businessman's Ten Commandments," in the January 3 issue of THE IRON AGE and can think of no more commendable goals for a business man to keep before him.

I am sure that you realize that it is much harder for some businessmen to live up to these commandments than for others who are more fortunately situated. What I am saying is that the leadership of a business determines, to a large extent, the ability of its employees, as a group, to achieve these goals; and incidentally, some of our largest and most propressive companies have apparently adopted working philosophies that would be hard to correlate successfully with the personal goals you suggest.

You have touched upon a subject that is very close to the roots of our whole economic philosophy. Much publicity has been given to the developing of business automations. I think it is very important for the philosophy you indicate in your editorial to be given a louder voice. *W. T. Shugg, Mgr., Market Planning, Continental - Diamond Fibre Div. of The Budd Co., Inc., Newark, Del.*

---

### No Exception

Sir:

Congratulations on the fine job done by THE IRON AGE in its annual issue. Of course, it is not an exception but really the kind of thing we have come to expect from THE IRON AGE.

We at The Magnesium Assoc. appreciate the editorial recognition given to our metal and are always glad to cooperate with you to make this possible. However, for your 1958 issue, we would like to suggest that magnesium be included in the chart Nonferrous Prices on Cubic Foot Basis which appeared on p. 163. It does seem that it would make the nonferrous picture much more complete. *J. Singleton, Exec. Sec'y., The Magnesium Assoc., New York.*

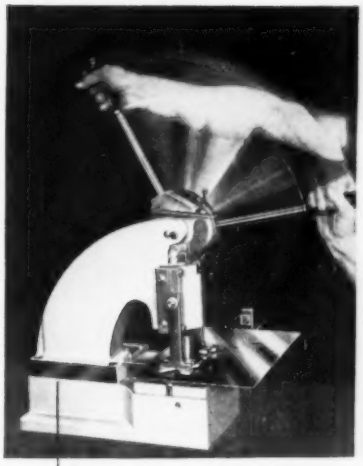
### British View

Sir:

I would be glad to have four reprints if possible of your excellent article "Pros & Cons of Heat Treat Stop-Offs" in THE IRON AGE, Nov. 15, 1956.

I must say I always find THE IRON AGE to be a first class review of trends and developments in the American metalworking industry. *A. Goffey, Chief of Laboratories, D. Napier & Son Ltd., Liverpool, England.*

"The Safety Director says you're accident prone, Smith. I'd like to think differently . . ."

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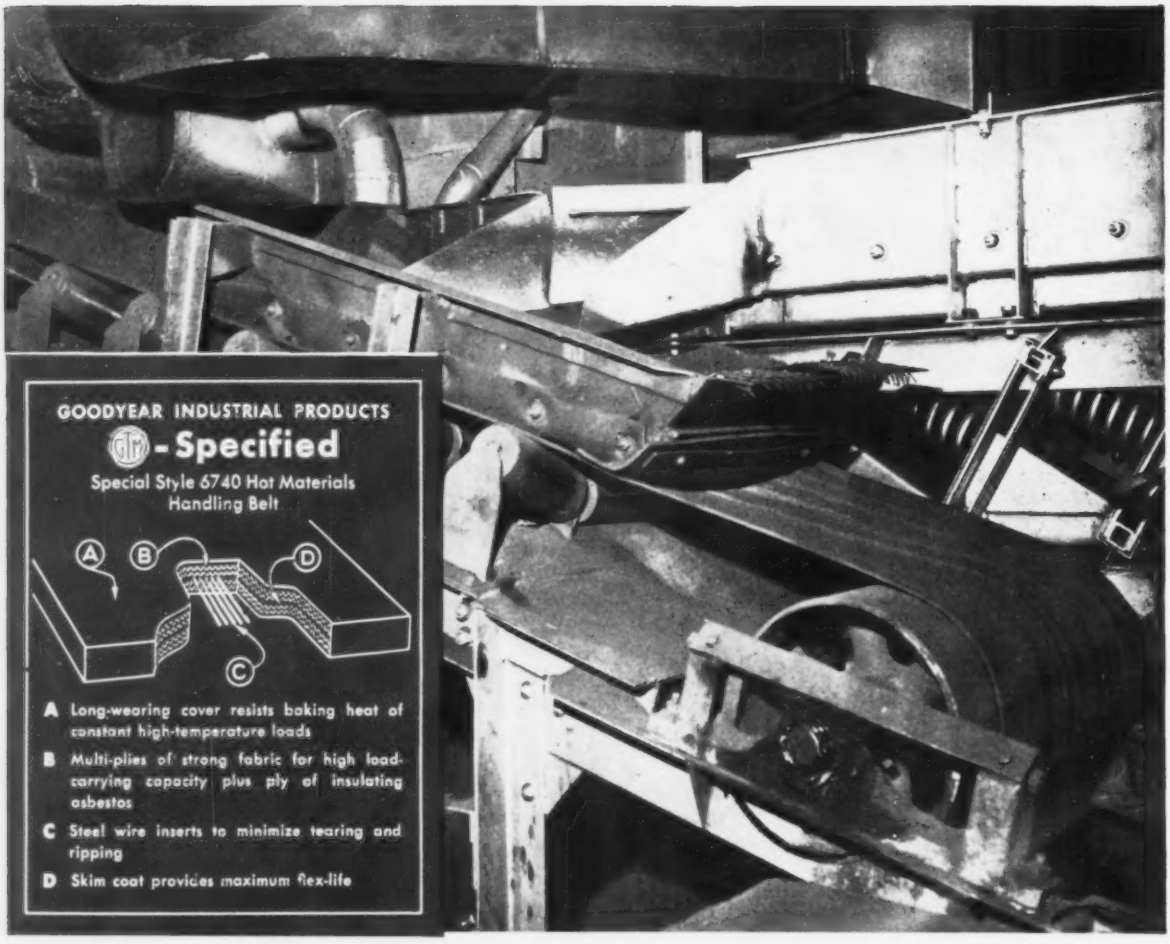
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D Skim coat provides maximum flex-life

# G.T.M. Saves $4000/year on shake-out refuse belts

SHARP, hot shot, gates, risers and other scrap quickly tore and burned up refuse-handling belts at this automotive foundry. On the average, the 126′ belts only lasted two months. Usually large patches had to be put in the belt to get even two months' service.

Special, wire-inserted belts (see blueprint) and vulcanized, rather than steel-plate, splices were suggested by the G.T.M.—Goodyear Technical Man. Result: *Service averages six months with $4000 annual savings.*

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**IT'S SMART TO DO BUSINESS** *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

## fatigue cracks

### Two Ways To Get A Story

In our business, there are two ways to get a story.

One method is known as "taking it off the west wall." Which means that an armchair editor slips a sheet of copy paper into his typewriter, leans back and stares at the wall while he dreams up a piece based on his vast store of knowledge about a given subject. Sometimes this works fine, and we're not strictly agin it.

### Sifting the facts

But THE IRON AGE, for lo these last 100-odd years, subscribes to the buttonhole method. This means that our staff of alert editors forsakes the comforts of a warm office in wintertime and gets the real pitch from the people who can answer a passel of penetrating questions.

That's just what we did to bring you our special survey report on steel inventories. Our editors did a fine job of sifting fact from fiction. They put the finger on just where inventories stand today as compared with last August when the 34-day steel strike ended. They talked to the automakers, the appliance people, the machinery builders, oil and gas men, the farm equipment makers. They buttonholed just about everybody of importance who sells or uses steel.

### Eye-opener

It makes good reading. It will open your eyes to a lot of things beneath the surface. It will help you decide whether steel inventories are topheavy or just right. It will let you in on what the automakers and others are thinking about their inventories. There are a lot of fine points to this steel inventory situation that don't meet the eye—unless the experts tell you what they mean. And we talked with the experts.

Read it! You'll be glad you did!

### Human Engineering

The help we get from unexpected quarters sometimes amazes us. For years we've been tipping over glasses, bumping into doors, knocking over ladders and in general showing a high degree of clumsiness.

Now we've got a better answer. It comes in the form of an article on human engineering in Battelle Memorial Institute's Technical Review. Human engineering, the authors say, is research directed to matching the design of machines to the capabilities of the men operating them.

The machines can be anything from simple hand tools to industrial presses and machine tools, to complex machine systems.

Not only that, but authors Dr. R. S. Laymon and C. A. Christner claim human engineering principles can be applied to man-machine situations in the home as well. They point to the many sources of costly and painful accidents such as stepladders, chairs, and home workshop tools.

This is for us. Look out for that darned ladder!

"I presume you're retired too!"

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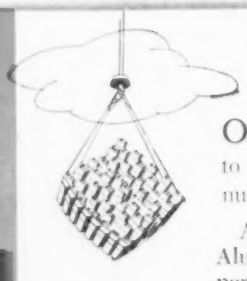

OUR BUSINESS in the United States is to supply you with primary aluminum for the products you fabricate.

As a primary metal producer, Aluminium Limited's facilities,* experience and knowledge are focused in two directions. First, on the economical production of aluminum ingot in neighboring Canada with its vast resources of low-cost hydroelectric power. Second, on developing new uses for aluminum through research and product development and assistance to aluminum fabricators.

Today production capacity is being substantially enlarged at our reduction plants in Canada to help provide an adequate supply of aluminum for you.

On many occasions we may be able to assist you with technical information on how to make the fullest use of your fabricating facilities.

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## dates to remember

### FEBRUARY

**American Management Assn.**—Marketing conference Feb. 4-6, Hotel Statler, New York. Assn. headquarters, 1515 Broadway, New York.

**American Society for Testing Materials**—Annual committee week and spring meeting, Feb. 4-8, Benjamin Franklin Hotel, Philadelphia. Society headquarters, 1916 Race St., Philadelphia.

**The Society of the Plastics Industry, Inc.**—Annual exhibit and conference, Reinforced Plastics Div., Feb. 5-7, Edgewater Beach Hotel, Chicago. Society headquarters, 250 Park Ave., New York.

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EXPOSITIONS

**1957 Nuclear Congress** — March 11-15, Philadelphia.

**American Society for Metals**—March 25-29, Los Angeles.

**American Foundrymen's Society**—May 6-10, Cincinnati.

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**Malleable Founder's Society**—Technical and operating conference, Feb. 7-8, Wade Park Manor, Cleveland. Society headquarters, 1800 Union Commerce Bldg., Cleveland.

**Drop Forging Assn.**—Winter meeting and exhibit, Feb. 11-13, Edgewater Beach Hotel, Chicago. Assn. headquarters, 419 S. Walnut St., Lansing, Mich.

**The Institute of Surplus Dealers**—Sixth annual trade show and convention, Feb. 16-19, New York. Society headquarters, 673 Broadway, New York.

**American Institute of Mining and Metallurgical Engineers**—Annual meeting, Feb. 24-28, Roosevelt and Jung Hotels, New Orleans, La. Society headquarters, 29 W. 39th St., New York.

### MARCH

**American Machine Tool Distributors' Assn.**—Spring meeting, March 6-7, El Mirador Hotel, Palm Springs, Calif. Assn. headquarters, 1900 Arch St., Philadelphia.

**Pressed Metal Institute** — Technical meeting, March 6-8, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

**Steel Founders' Society of America**—Annual meeting, March 18-19, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

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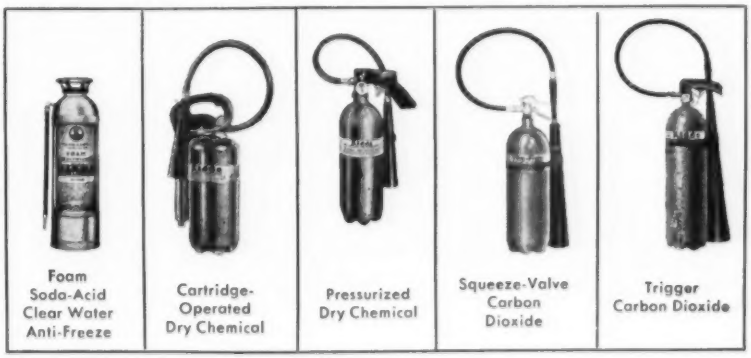

# What we did for OTHERS

We have developed more than 3,500 *different designs* of hydraulic presses of *all types* to cut costs, simplify manufacture, improve quality and increase production for others.

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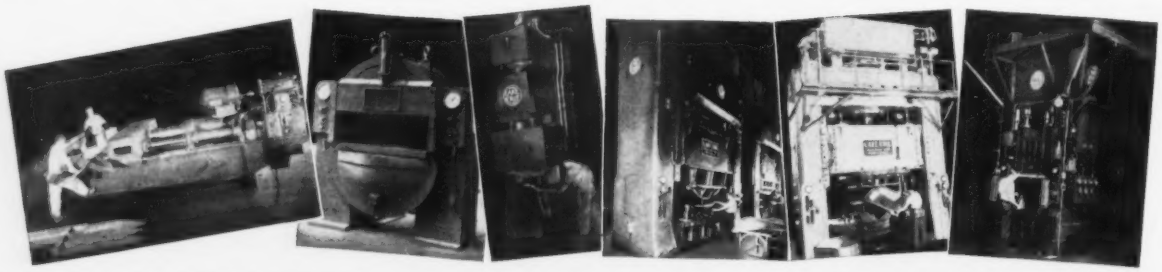
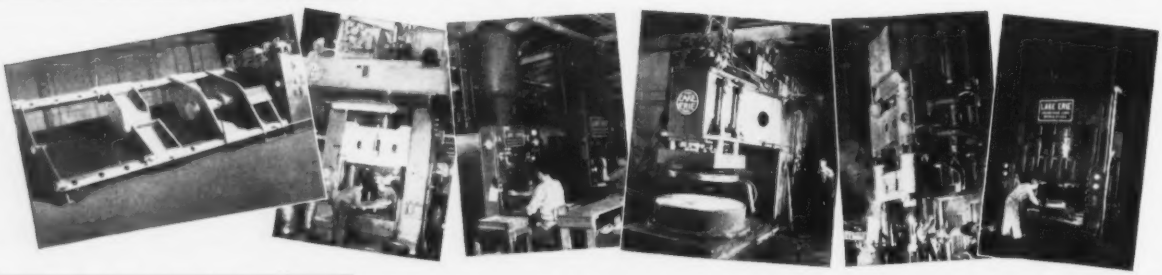
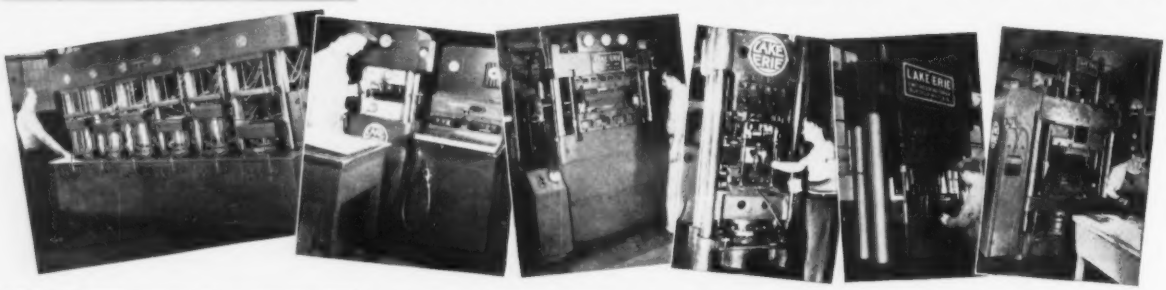


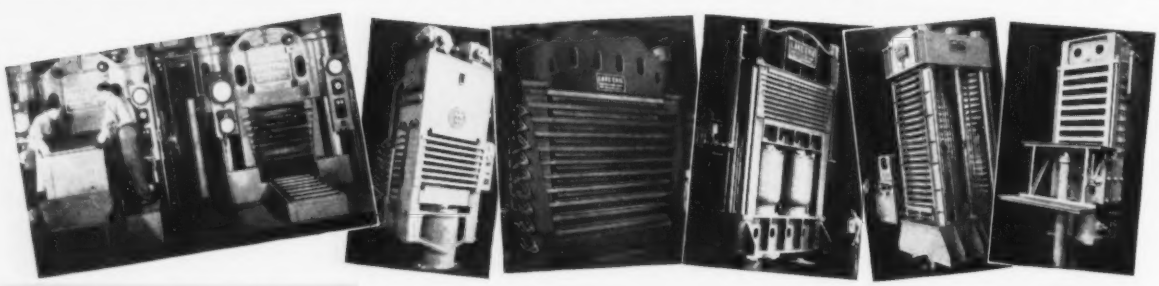
METAL WORKING — DRAWING • BENDING • FORCING



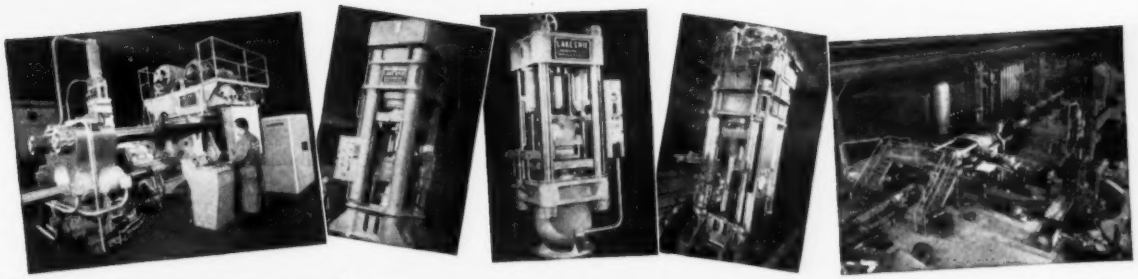
METAL WORKING — FORGING • HOBBING • FLANGING



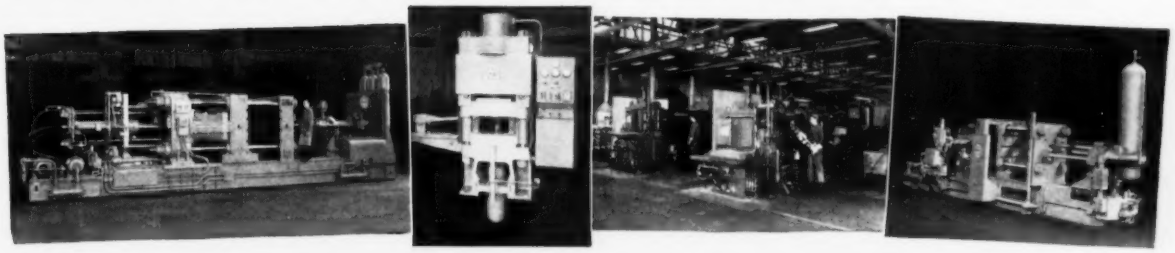
PLASTIC MOLDING — COMPRESSION • TRANSFER • LABORATORY



WOOD & PLASTIC PANELS — HARDBOARD • WALLBOARD • PLYWOOD • LAMINATES



**EXTRUSION PRESSES** LEAD • CARBON • NON-FERROUS METAL



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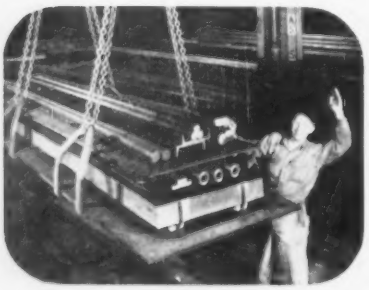
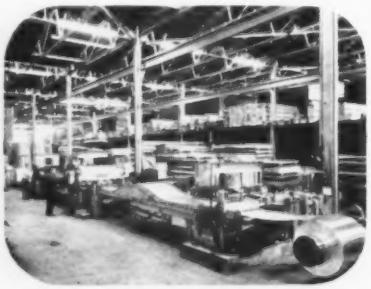
But perhaps you don't always remember that Ryerson offers you much more—many other important products and services such as aluminum, plastics and fabricated construction steel. The pictures below illustrate the extent of our service. For a complete listing see the familiar red Ryerson catalog. Then as your needs arise—or whenever you have a question of selection, fabrication or application—look to Ryerson as your most complete and dependable source of help.

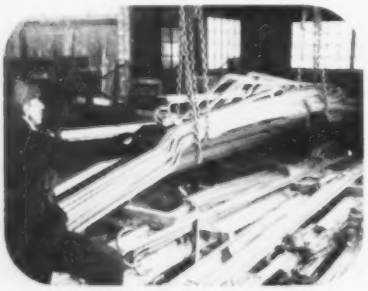


**STEEL FROM STOCK**
Carbon steels, alloys, stainless—bars, structurals, plates, sheet and strip, tubing—you can get quick shipment of one piece or truckloads from the world's largest steel stocks, at Ryerson. Get the steel with the certified seal—of quality.

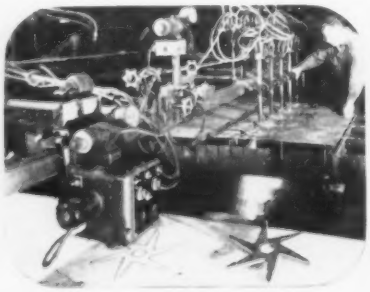


**ALUMINUM FROM STOCK**
In areas served by our Chicago, Milwaukee, New York, Boston and Connecticut plants, draw on Ryerson stocks for aluminum too—sheets, coils, bars, plates—practically any aluminum requirement in stock sizes or cut to your order.

**PLASTICS FROM STOCK**
The convenience and dependability of Ryerson service is also available to buyers of industrial plastics—PVC pipe, valves and fittings, sheets and rods, rigid Kralastic pipe, flexible polyethylene pipe and tubing, etc.



**FABRICATED CONSTRUCTION STEEL**
Re-bars, spirals, etc. for reinforced concrete construction are fabricated at Ryerson plants from coast to coast. Also, at Chicago, Ryerson fabricates structural steel for the framework of buildings, bridges, etc.



**FLAME CUT STEEL SHAPES**
Your nearby Ryerson plant can quickly flame cut almost any shape from carbon, alloy or stainless steel—producing a single piece or thousands accurate to size and ready for your application. We take the work load—you save money.

**MACHINERY AND TOOLS**
The broadest line of metal-working equipment available from a single source is offered by the Ryerson Machinery and Tool Division. You can choose from thousands of types and sizes produced by nearly one hundred manufacturers.

# RYERSON STEEL

*In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.*

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# NEWSFRONT

### Oxygen Steelmaking: A Status Report

Want a good gage on the growth of oxygen converter steelmaking? Try this for size. One reliable estimate has it that U. S. oxygen converter capacity will total 2,072,000 net tons by the end of 1958; Canada's another 920,000 net tons. The estimates cover only plants already working or slated for operation.

### Researching The Warehouse Buyer

A two-year study of warehouse customer buying habits gets underway soon, using IBM equipment. Steel purchased in cut sizes or special gages will then be matched off against the most likely sales prospects, as automatically detected by an IBM-card runthrough. Other data to go in the completed files: types of metal about which inquiries were made but not sales and personal notes on P.A.'s. About 25,000 customers will be covered.

### Ups Openhearth Door Life

A Chicago-area steel mill has upped openhearth door life 35 pct, by setting up an efficient, centralized relining station. Assembly-line shop was set up to meet hectic demand for doors and to handle supplies for four furnaces. Better maintenance practices have meant fewer door changes, less furnace fuel-off time. Crew of six turns out 8 to 10 doors daily.

### Congress May Aid Older Workers

Discouraged with efforts to get industry to hire older workers, Congress may try a "sugar-coating" approach. Bills are being introduced to give tax deductions to employers of up to $1000 for each worker over 45 hired. This would mean $520 tax saving for a corporation in the 52 pct tax bracket. Congressmen feel appeals to social consciousness, logic, have fallen flat.

### Stockpile-Purchasing Climbs

Stockpile purchases by Government this year will go up by about $25 million. List of goods being purchased is shrinking, but surviving program costs more. Congress is being asked for $130 million appropriation, to be added to $115 million carryover funds for purchases. Diversions of copper and nickel to industry will continue. Aluminum, though in easy supply, will continue delivery at 1956 rate of 200-million lb a quarter at least through June.

### Automakers Hope for Tax Restyling

Automakers see a chance to save $30-million a year through proposed excise tax changes. They're getting some Congressional support in asking for amendments. Example: automakers currently pay taxes on auto parts sold for farm-equipment use, request refunds later. This means costly bookkeeping. Exempting such parts from the tax in first place would end this pointless accounting expense.

### High-Nickel Electrode: Good Go-Between

You can join most dissimilar metals found in the average shop with one of the newer high-nickel electrodes. Secret lies in using one which has a thermal expansion rate compatible with both sides of the dissimilar metal joint. Thus far, experience shows such an electrode welds up to 90 pct of commonly-joined dissimilar metals. Add as a bonus: and joins them without preheating.

### Largest Caliber Lead Crystal?

Naval Research Laboratory has fathered a 56-lb, 14-in.-long, 3½-in. diam lead crystal. One of the world's largest, the crystal was grown to help further neutron diffraction experiments on polycrystalline samples. It was made by taking high-purity lead pellets through a temperature gradient in a special furnace. Function: to help isolate desired neutrons.

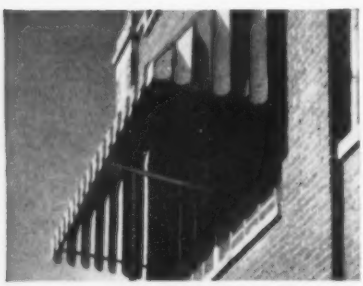
### Computers: Why They Like Them

One moderately-large East Coast metalworker lays out more than $1200 monthly on a computer-and-accessories setup. Why? First problem fed computer, to come up with best one of 9,180 possible designs on an aluminum bar section, resulted in a design weighing one-third less and twice as strong. Estimated savings at present production levels: $1500 weekly.

# ACP Alodine® PREVENTS CORROSION OF PAINTED AND UNPAINTED ALUMINUM

**AIRCRAFT MANUFACTURERS** are major users of Alodine for protecting the metal and improving the paint adhesion on both commercial and military aircraft. They like the quality of the coating and the economy and simplicity of the process.

Whether you are using painted or unpainted aluminum in your products, it pays to protect the metal with ACP Alodine. The chemical coating formed by this ACP product becomes an integral part of the metal, bars corrosion, adds years to the life of the metal. It is inexpensive, too. Anodic coating processes are relatively costly. So the savings realized through the application of ACP Alodine are substantial. Costs of heat, electric power, labor and processing time are materially reduced. There's another big economy, too – a scratch in the coating can be quickly repaired.



**IN THE PROCESSING** of aluminum strip for metal awnings, the Alodine process has cut operating costs as much as 33%, increased production as much as 50%.

**A LARGE METAL TILE MANUFACTURER** applies Alodine coating prior to putting porcelain on the aluminum—makes substantial process saving without sacrificing quality.

**MANY TRAFFIC ROAD MARKERS** are treated with Alodine prior to applying the paint or reflective laminate. Alodine provides an excellent base for these materials.

**LEARN ALL ABOUT ACP ALODINE. Bulletin 1424 describes the various types of ACP Alodine and gives information which will help you select the proper type for your particular application. Write for your copy today.**

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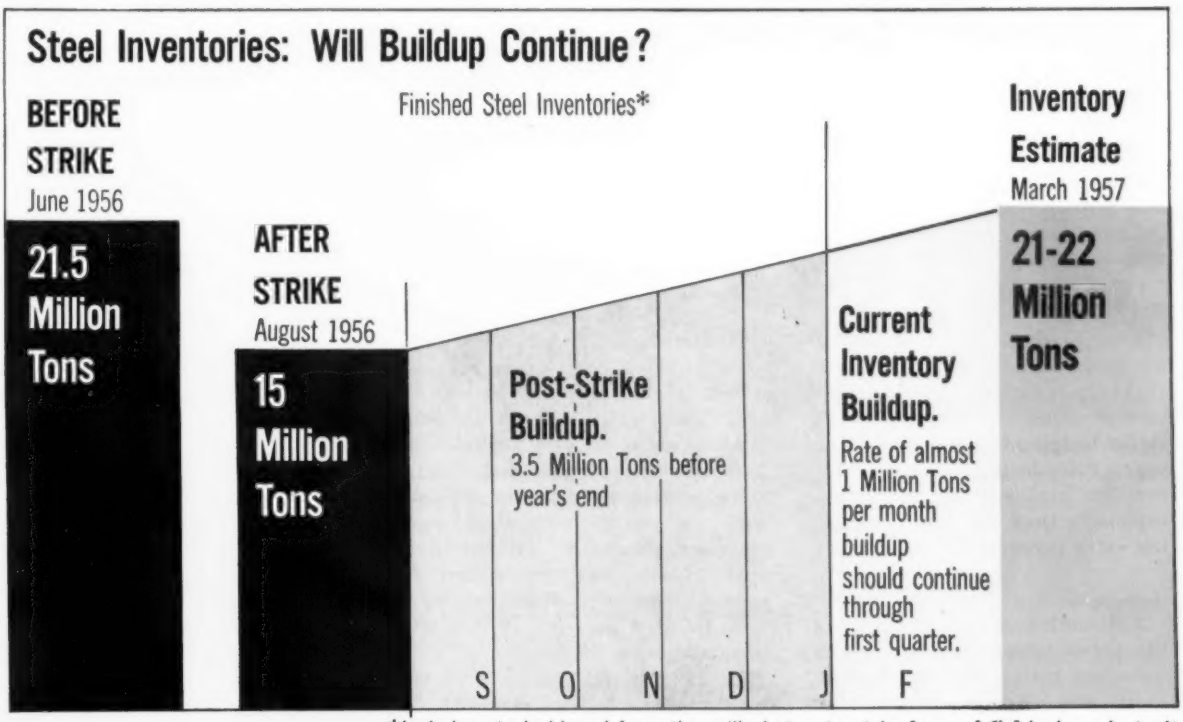



*Includes steel shipped from the mills but not yet in form of finished products. It does not include finished products at factory or in distributors' hands.

# Stability Returning To Steel Market

**Long term labor contract starts to pay off . . . Producers and consumers feel relief from pressure . . . Inventories are climbing, but emphasis is on balance . . . Survey shows inventory picture.**

◆ STABILITY IS creeping back into the steel market. The frantic twists and turns of other years are beginning to straighten out. The three-year labor contract in steel is starting to bear fruit.

A leveling of the peaks and valleys in steel demand and production hasn't arrived yet. But it seems to be on the way. At least, the signs point in that direction.

This approach to "normalcy" is what the steel mills were aiming for when they took a 34-day strike last summer. They wanted to get out from under the traditional one-year contract with steel labor. The annual threat of strike was perpetuating the frantic market tone prevalent in the 10 post-war years through 1955.

**But there are at least two hitches to this dream of an orderly steel market:**

**1. World-wide tensions could upset the applecart at any time.**

**2. For some steel users, "normalcy" is a long way off. The plate and structural markets will be hand-to-mouth for at least two more years.**

An IRON AGE survey shows that steel inventories have been on the rise since the strike ended last August. The buildup is continuing, although there are signs of a leveling off. Some users would like to fatten their stocks, but can't. Others are cutting back.

Here's the way the inventory push shapes up:

During the strike, stocks of fin-

ished steel dropped to about 15 million tons—a reduction of some 6.5 million tons.

### Buildup Took Months

In September, the buildup was about a half-million tons. During fourth quarter, stocks mounted at the rate of a million tons a month. The monthly rate of buildup is slightly under that now. It's estimated that inventories will be back to the pre-strike record of 21.5 million tons by March.

The expected March level, while a record, is far from unwieldy in view of current industrial activity.

The market trend toward a healthier foundation can be credited largely to the outlook for continued labor peace. First-half strike hedging is no longer necessary. Price-hedging is still a factor. But higher prices can be less expensive than the cost of carrying extra inventory.

### Things To Watch

Automotive is an example of the trend toward a more stable inventory policy. General Motors, Ford, and Chrysler had enough steel on hand to last 30 days, until recently. But they're well on the way to reducing these stocks to an average of about 25 days.

**Here are some caution signals turned up by Iron Age editors in their talks with the mills and their customers:**

**1. Veterans of the steel market point to the danger of playing inventory cards too close to the vest. The mills are not interested in serving as warehouses for their customers. A sharp upturn in demand or a sudden deterioration of international relations could leave the over-confident user high and dry.**

**2. The inventory buildup has not been universal. Large companies have been able to do a better job than their smaller brethren. The small outfits still have a job to do. A few little companies still complain they can't get enough of even the so-called "easier" products, such as sheets.**

**3. The so-called sheet looseness is hard to pin down. It's a case of now you see it, now you don't. Some users are playing games with deferments, canceling out one week, reinstating partially the next. Result: no clear-cut sign of a definite downtrend in consumption, or of a decision to live off inventory.**

Says a Midwestern auto parts fabricator:

"Our tip-off that this market is not so loose is that we have not been flooded with offers of extra tonnage."

### Structural Picture

The outlook for structural users is still grim. The construction and highway building booms are going strong. Delivery promises on fabricated structurals are stretched out for months. In some cases, channels are being formed from light plate, a costly process.

The easing in sheet demand is a help to users of light plates. Mills are now amenable to scheduling some light plate production on their sheet-strip mills. But heavy plate consumers are still in a blind alley. Many are paying premiums for gray market tonnages and for imports.

The plate shortage, in turn, is starving the electricweld linepipe mills. These mills are working only two turns, whereas the amount of business available probably would justify a three-turn schedule. This is prolonging the booming demand for linepipe.

Tight money is having some effect on steel buying, but it seems to be limited to small users. This has resulted in a policy of placing orders for small tonnages, or working on a month-to-month basis rather than a quarterly basis. For some small outfits, funds for

## Inventory Climb Involves All Products

Durable Goods Industries Inventories (end of month)

inventory are harder to come by. The policy of spacing deliveries minimizes the need for inventory borrowing.

An area-by-area summary:

**Detroit** . . . The Big Three automakers have a little less than 30 days' inventory. It looks like they will slide even further in a short time. One company already down to 25 days' supply. This compares to 40-45 days before the strike. Need for hedging against a steel strike has vanished.

Supplier firms also have a good supply of steel. Inventories are said to be "adequate."

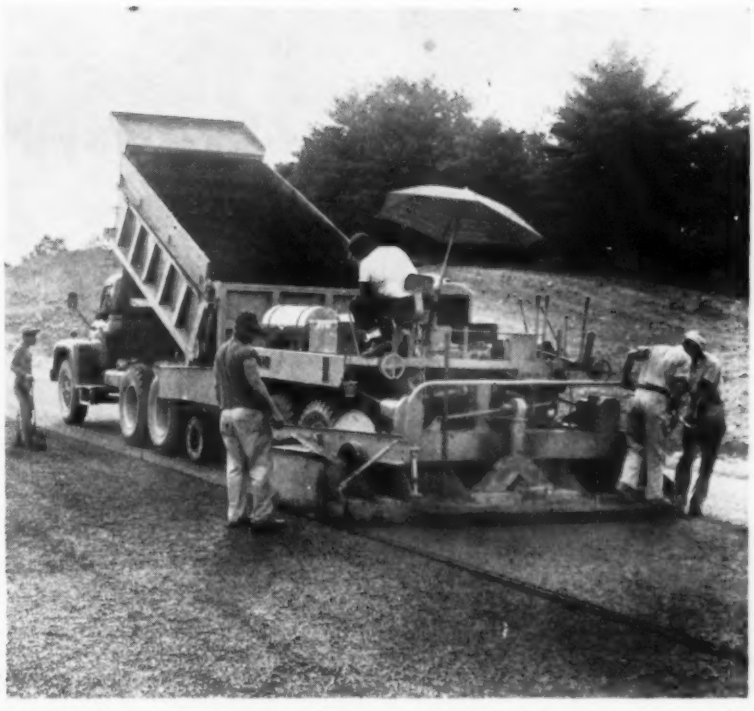
**New York** . . . Talk of bloated inventories among metalworkers in the Northeast is exaggerated. Apart from special situations, inventories may be summed up as normal-to-lean. Steel users are optimistic, but cautious on long-term commitments. Inventories are being tied closely to production, where delivery times permit.

### The Midwest

**Chicago** . . . Appliance makers' inventories of cold-rolled sheet vary from good to high, resulting in some holding back by buyers. Farm equipment inventories are high, but this is seasonal; big manufacturing gets underway in late January and runs through June. Automotive buying still strong, but inventories are rising, and buying cutbacks are expected by February.

**Cleveland** . . . In an area with a high concentration of sheet capacity, buyers are shopping around for best delivery dates. This is pushing mills into carrying heavier inventories of semi-processed products to stay competitive. Production men are pressuring sales for orders. And deliveries must be made on schedule. Auto stamping plants have cut inventories sharply.

**Pittsburgh** . . . Inventories of sheet, bars, and continuous weld pipe are reported high. Plates, structurals, seamless pipe, and large diameter pipe are tight as ever. Plate and structural inventories are low and out of balance. And the situation is getting worse. One company is getting more than half its plate from warehouses in one area and has gone from gray to black market in another.



ROADBUILDING equipment makers are getting set to turn out about 70,000 more major pieces, like this paver, by 1961. Majority of the equipment will be needed in 1957-1958. Builders will expand operations 20 pct.

## Roadbuilding:

### Over $1 billion in new equipment expected.

Construction machinery builders are all set for the federal highway program. So says Frederick Salditt, vice president of Harnischfeger Corp., Milwaukee. He told a Senate subcommittee that construction equipment makers have enough capacity to handle new machinery needed for highway building.

### How Much?

Mr. Salditt figures that during the first five years of the program —from 1957 to 1961 inclusive— about 70,000 major pieces of new highway construction equipment must be built. This is on top of current inventory and normal replacement.

Mr. Salditt points out that if the highway demand were spread evenly over the five years, the extra strain would be only 10 to 15 pct over present volume. But, he adds, some two-thirds of the additional equipment will be needed in the first two years.

His solution: reduce exports and increase output by about 20 pct. The industry last year built equipment worth $2.5 billion. Of this some $500 million was for export.

### Wire Fabric

Mr. Salditt's forecast was based on (1) a good supply of raw materials, including steel, (2) no major spurt in general construction, other than highway, and (3) modest military requirements.

Frank B. Brown, managing director, Wire Reinforcement Institute, told the subcommittee his industry is in good shape for the highway program. He pointed out that in 1955 welded wire fabric makers shipped only 475,000 tons, against a capacity of 750,000 tons.

He suggested roadbuilding contracts be let in the winter instead of spring so that his members could stockpile fabric for the spring push.

Wire Reinforcement Institute represents 95 pct of domestic output.

# MAINTENANCE: Cut Costs By Planning

**Engineers exchange ideas at Plant Maintenance and Engineering Conference . . . They agree more planning is needed to meet demands of new processes . . . Industry to spend 10 pct more for plant upkeep in 1957.**

◆ TIME WAS when maintenance meant keeping the floor swept, the roof patched, and electric light bulbs burning. A maintenance staff meant a few janitors and a mechanic who could fill in as millwright, carpenter, electrician, or plumber.

Except for the smallest plants, such a setup now is just a memory. Maintenance today is big business.

In 1956, U. S. industry spent a staggering $12 billion for plant upkeep. This year the total may reach $13.2 billion—a 10 pct increase.

Cost conscious plant managers know that reducing maintenance costs is money in the bank. Yet the trick is to do it without risking costly production delays due to equipment breakdown.

By cutting maintenance costs too thin, dollar savings may be canceled out by lost production. The answer is planning.

### Room For Improvement

On Jan. 28-31 at the 8th Plant Maintenance and Engineering Conference and Show in Cleveland, some of the best men in the business exchanged notes on maintenance programs.

All agreed that maintenance engineering has come a long way. They agreed, too, that there is still a lot of room for improvement—and a lot of money to be saved. They pointed to the increasing complexity of modern manufacturing equipment and processes. It is placing added burdens on maintenance forces.

One plan was outlined by O. S. York, manager of maintenance engineering for E. I. du Pont Co., Wilmington, Del.

"New techniques must be developed to provide optimum maintenance cost, not necessarily minimum maintenance cost, because no longer can maintenance be looked on as a necessary evil," says Mr. York.

"It is not as important to know whether maintenance cost is going up or down," he continues "as it is to know that mill cost is being lowered and high quality production maintained."

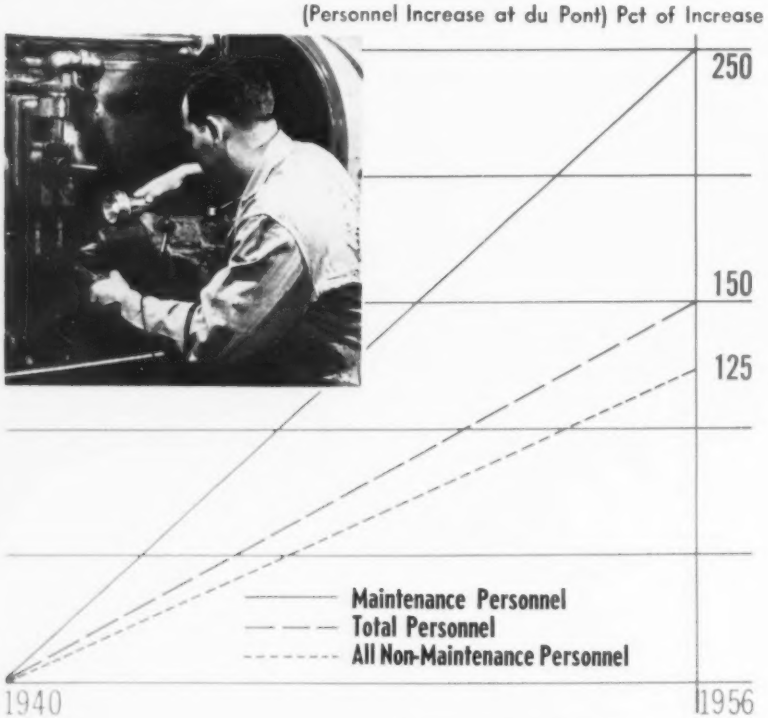
### Some Recommendations

He recommends (1) improved administrative controls to provide maximum performance and optimum maintenance cost; (2) improved selection, training and upgrading of mechanics to provide skills to maintain new equipment; (3) improved tools and techniques to insure effective use of skills; (4) improved preventive and corrective programs to reduce equipment outage to a minimum, insure continuity of operation, and assure quality and quantity production.

Changing the character of the maintenance job are such things as automatic controls and instruments, new engineering materials, and finer precision in machining operations.

For example, in the 1930's tolerances in the range of plus or minus .007 to .008 in. and surface finishes of from 80 to 100 microinches were generally satisfactory

## How Maintenance Grows In Importance




Source: E. I. du Pont de Nemours & Co.

to meet process requirements. Today more tolerances are in the vicinity of plus or minus .005 in. and surface finishes less than 10 micro-inches.

In the future, say the experts, we can expect tolerances of .0002 to become commonplace. It will mean more skill, more precision on the part of maintenance men plus more expensive maintenance tooling.

The maintenance payroll in the duPont Co. is increasing twice as fast as all other wage rolls. As processes become more complex, the trend is expected to continue, indicating that in the next decade the number of maintenance mechanics may increase by another 50 pct.

Another viewpoint was supplied by C. A. Monson, methods and planning specialist for Procter & Gamble Co., Cincinnati. He lists the major maintenance problems as lack of information, lack of proper tools, lack of materials.

"Our experience has shown that as little as 25 pct of the time spent on maintenance work is necessary work," he states, adding:

"They are problems which management can control through adequate planning and scheduling."

### Labor Cooperation

Organized labor must share responsibility for improving maintenance programs. Ralph G. Smith, assistant labor relations director for Dow Chemical Co., explains how labor can cooperate by: (1) allowing management more flexibility in the use of skilled manpower; (2) cooperating with company efforts to start maintenance training programs.

For example, a pipefitter waits 30 minutes until a welder arrives to do five minutes of tacking, even though the pipefitter is capable of doing the necessary tacking.

"Thousands of hours of productive effort are lost each week because organized labor, in many instances, refuses to let management make maximum use of the skills of its employees," Mr. Smith says.

Industry's giant maintenance problems are gradually being solved, but it will mean a lot more teamwork for major improvement.

MAINTENANCE

# CENTRAL LUBE: Use Grows

**Trend to large manufacturing units pushes use of central lubrication systems . . . But young industry has scratched only 25 pct of market potential . . . Steel mills are big users.**

◆ PRODUCTION and maintenance men in steel mills and metalworking plants aren't burning out their bearings as often as they used to.

The tranquilizer is the central lubrication system which delivers lubricant under positive pressure to a bearing. It will shut down a whole machine if a point is not being oiled and can be monitored by a single gauge.

Proponents of the system still have an uphill fight. On new equipment, high labor installation costs often add up to more than the material and engineering. On installed equipment, it generally takes a breakdown to start the ball rolling.

Major independent lubrication firms are Farval Div., Cleveland Worm & Gear Co., and Trabon Engineering Corp., both in the Cleveland area. Other firms specializing in auto applications are Alemite Div. of Stewart Warner and Lincoln Engineering Co. of St. Louis.

### Big Push from Steel

"Our industry is getting only about 25 pct of the business potential" N. S. Robson, Trabon president, said. Most of the push for centralized lubrication is coming from the steel industry, because of high bearing loads; from automation for centralized control; and from machinery builders because of the trend to smaller, higher speed machinery.

"Business outlook for this year is about equal to 1956. Continuing heavy capital goods expenditures on which we are dependent should offset conclusion of new automotive stamping plants which have been major potential for us."

Some records in the steel industry have been startling, especially on critically important blooming mills. One Pittsburgh mill installed a centralized system on a bar roughing mill which needed new bearings every 6 weeks. The first set installed after the conversion are still in service after 1½ years.

### Fire Prevention

The maintenance time eliminated is translatable into increased available production time. Another Pittsburgh area mill has been able to keep an antique 40 in. blooming mill in operation by replacing an old soap grease system with centralized system.

The ghost of the Livonia, Mich., General Motors fire has brought on a major redesign of auto plant press lubrication systems. Automakers now universally specify closed-circuit central lubrications systems.

Machine tools, especially larger ones, are being steadily converted to central systems, especially where there is continued bearing trouble.

In can making one Chicago firm is saving $50,000 per year on an assembly line by cutting downtime for lubricating from three hours to 15 min. per day on 249 fittings. Rejections from dripping excess grease were also cut down. It paid for itself the first year.

A very rough rule-of-thumb cost estimate is about $30 to $40 per lubrication point. On new construction, installation costs are high. On conversion jobs where plant personnel are used, they are lower. Cranes have highest labor costs because of high altitude work.

Biggest single project on record was the Fairless Works of U. S. Steel with about 35,000 bearings resulting in complete installation cost of about $300,000.

MANAGEMENT

# LIBRARIES: Geared to Serve Business

**Today they're arranged with the businessman in mind . . . Larger ones usually contain a separate department devoted to business, science and industry . . . Many firms now take out company library cards.**

◆ YOUR NEARBY free public library is a handy storehouse of helpful business information. And the modern library is geared to help businessmen find that information more easily.

Years ago someone searching for books, magazines, and pamphlets in the field of metalworking would have to visit three different sections of a library. Today that picture has changed. Most large libraries are now departmentalized by subject categories, rather than by the materials they contain. Usually one of these departments, and an important one, is that given over to business and industry.

Typical of this newer approach is the Business, Science and Industry Dept. of the Central building of the Free Library of Philadelphia. There, with the aid of 80 to 90 thousand books and over 1500 periodicals, Mrs. Jean Hopper and the staff are ready to serve industry.

GETTING INDUSTRIAL INFORMATION is easier for businessmen with aid of librarians such as Mrs. Jean Hopper, Head of the Business, Science and Industry Dept. at the Central Bldg. of Philadelphia's Free Library.

### Photo-Copying Service

Telephone inquiries are answered, circulating material is available for outside use, and special material, not generally released, can be borrowed for a limited time. In cases where complete copies of printed matter are desired in a short time the library provides a photo-copy service.

Mrs. Hopper reports that many firms now use company library cards. With this system, employees in the various areas of a company request books by phone. The library checks to see if they are available, and the borrower dispatches a messenger to pick them up. Companies, like individuals, may take out 12 books at a time from the Philadelphia library.

Frequently the library can offer more help to the smaller business firms than to the larger ones. That's because the bigger concerns, with their own company libraries and reference files, have the answers already at hand.

Not readily apparent is the fact that even in cases where published data on a subject do not exist the library can still help. In such an event directories of industries, associations, and individuals may turn up names and addresses of those who can supply non-recorded data.

The business section of a library is prepared for—and gets—all sorts of requests for information. When the questions involve taxes, regulations, and laws the data provided by the governments—federal, state, and local—are useful.

Marketers turn for information to census data, industrial surveys, advisory and forecasting bulletins. Research and production personnel consult technical abstracts, catalog files and shop manuals. For more general industrial study there are statistical compilations, directories, annual reports, and economic and financial summaries. The library even has books available on how to look for business information.

Some libraries prepare periodic publications keeping businessmen up-to-date on what they have to offer in the way of facilities and services. Usually these bulletins include listings of current writings in books and other sources on topics of interest to business. In two of these publications—Newark's Business Literature and Cleveland's Business Information Sources—for example, you'll find reports on available material about automation, corporate mergers, atomic energy, credit, and purchasing to list just a few.

## Reading:

**Survey shows business men do plenty.**

The American businessman reads 25 pct of his waking hours, says American Management Assn.

He spends fours hours at the office and one hour at home reading reports, correspondence, books, newsletters and business magazines. And despite the popular concept, fewer than one-third do any business reading going to and from work.

Biggest time consumers are memos and reports, which account for 60 pct of business reading. About 17 pct of reading time is spent on business magazines. The average executive has personal subscriptions to eight, besides those circulated by his company.

About 80 pct call some of their reading time wasted. A common complaint is "wordy or repetitious material." One out of four tries to improve reading speed, or has incoming matter screened. Twenty pct have been exposed to company rapid reading courses.

The proportion of book readers among the 213 businessmen covered by the AMA survey is higher than the proportion among college graduates. Preference is for nonfiction; history, biography, economics, science and management. The average businessman read 11 non-business books in 1956. Top management read four business books last year. Middle managers averaged six.

### New Home for NBS

National Bureau of Standards will move to brand new headquarters on a government-owned 518 acre site in Montgomery County, Md.

General Services Administration has awarded the contract for preliminary architectural and engineering studies to the firm of Voorhees, Walker, Smith, and Smith, New York. Deadline is March 15, 1957.

Project includes a main office, laboratory buildings, powerhouse, radioactive building, garage and other miscellaneous structures. About 1.1 million sq ft of assignable space will be provided.

RESEARCH

## FURNACES: Harness The Sun

**Solar Furnace Symposium reveals new advances in furnace designs . . . A number already are operating at research laboratories . . . Industrial applications coming.**

◆ A STRANGE, new apparatus is appearing in research laboratories' back yards. It is the solar furnace.

By harnessing the sun's rays, science has found a way to generate higher temperatures under ideal research conditions. In operation, the new solar furnace works on the principle of the old-fashioned burning glass.

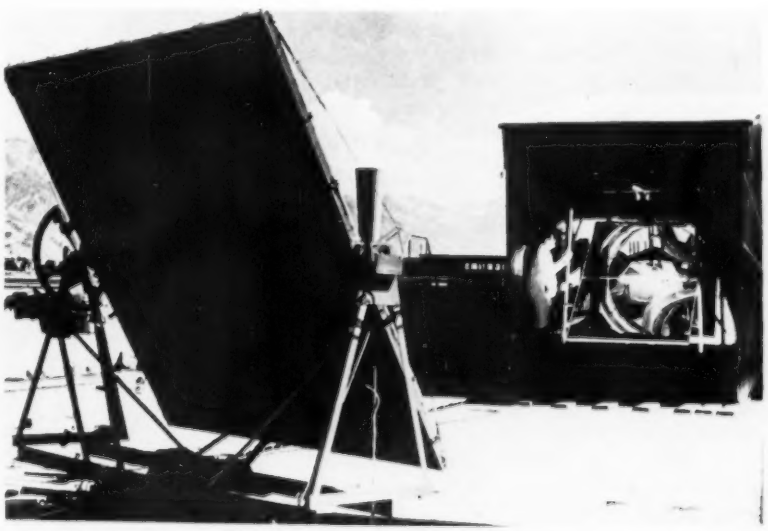
It offers industry the prospect of reaching operating temperatures not yet realized with conventional furnaces. It eliminates contamination, either by vapors from the furnace materials or the mass in its container. Furthermore, it operates in any desired atmosphere and can effect rapid, controlled temperature changes in heating and quenching cycles without limitations imposed by the furnace.

Kennecott Copper Corp. has completed a solar furnace made from a government surplus searchlight. It's cost: about $3,400. With it, Kennecott reseachers were able to fuse a niobium sample, which has a melting point of 2497°C. A number of other tests have been made with fire-refined copper and alumina.

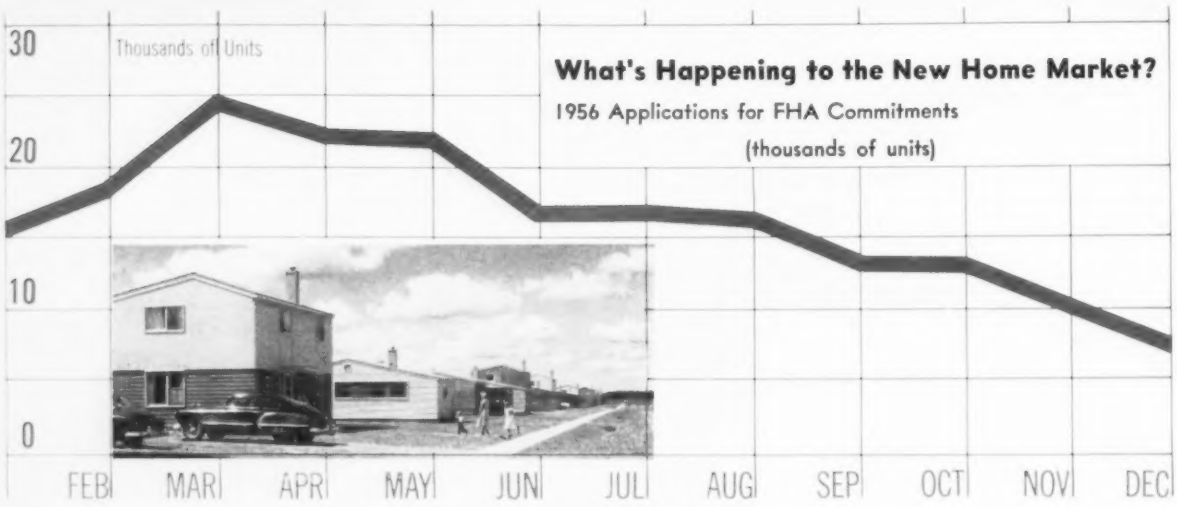
**May Replace Fuels**

Another solar furnace has been designed by Arthur D. Little, Inc., Cambridge, Mass., which offers a compact, flexible tool for exposing materials to temperatures up to 3500°C. Its basic component is a 60-in diam parabolic mirror. Accessories include a suntracking mechanism and sample separator.

For the immediate future, the uses of solar furnaces will be confined to the laboratory. But their industrial future is promising. Scientists see them as replacing other fuels, when other fuels become more costly.



SOLAR FURNACE on roof of Kennecott Copper Corp. Research Center is a converted government surplus searchlight. It cost about $3400 and can attain controlled temperatures up to 2500°C.




1954 monthly average = 28.2 1955 monthly average = 25.5

# NEW HOMES: Caught in Credit Squeeze

**Home building is caught between climbing prices and tight money . . . Dwindling market may affect appliances, other metalworking products . . . Builders may switch to low cost units.**

◆ THE OUTLOOK for new home building becomes more gloomy.

Number of new home starts continues to dwindle. The total slumped from 1.3 million starts in 1955 to 1.1 million in 1956. An optimistic outlook for 1957 is 1 million at best. Some experts believe that a drop to 850,000 isn't out of line.

Builders, in Chicago at the convention of the National Association of Home Builders, agree that something is wrong with the home building picture.

### Suppliers Suffer

It has been called the nation's second largest industry. It's weakness affects appliances, hardware, home utilities and fixtures, as well as the entire building trades.

Outspoken industry leaders hit at two main problems: Housing prices are going up again in 1957, cutting out a considerable market area. There's not enough money to finance a greater number of home mortgages in 1957. This will be aggravated as prices rise.

Sen. John Sparkman, chairman of the Senate subcommittee on housing, argues that the house priced at $15,000 or lower is disappearing. He points out that 80 pct of all income tax payments come from wage earners who make $5000 a year or less. They can't afford a $15,000 house. They couldn't get FHA backing at that price.

Senator Sparkman takes a dim view that raising the interest rates on VA home loans will lure more money into the home mortgage market.

However, the VA itself tells Congress that the 4.5 pct limit is too low. Spokesmen contend that unless the rate is raised, flow of money for VA loans will dry up.

VA officials point out that a .5 pct increase in rates in 1953 increased mortgage volume by 35 to 40 pct. Consensus of financial opinion today is that an advance in interest rates could not produce that kind of an upswing in 1957. There just isn't that kind of money available.

The possibility of reducing home prices is a factor. Builders are talking about cutting frills, putting up less costly homes this year.

### Not So Easy

But this is more difficult than it sounds. Prices of home building materials continue to increase. Cost of land suitable for home building is also rising. It will take a lot of frill elimination to make a new home available to the market builders would like to reach—$10,000 or less.

Credit sources aren't optimistic about mortgage money. Insurance companies, for example, supplied $5 billion in home mortgage money in 1956. But they are swinging more money into industrial expansion in 1957.

## Research:

**U. S. Steel builds new metals lab at Duquesne.**

U. S. Steel Corp. will build a new metallurgical laboratory at its Duquesne, Pa., works which, the company claims, will be among the largest and most impressive in the industry.

This will complete the two part program of improving and modernizing testing facilities at Duquesne. A chemical laboratory is already in operation.

A specially designed masonry-steel building will be constructed to house the new lab. It will feature porcelain enamel panels and stainless steel trim.

New equipment will include an automated etch testing line, magnetic particle and ultrasonic inspection instruments.

In addition to working with materials produced in the plant, Duquesne technicians will carry on production projects to augment work at the U. S. Steel Research Center.

The metallurgical lab will operate under the supervision of R. W. Graham, general superintendent, with Dr. B. R. Queneau, chief metallurgist, in direct charge.

## The Economy:

**President's report points to capital spending programs.**

Plans of business to spend for capital improvements are a dominant factor in the 1957 economy.

This is one of the major points of the Economic Report of the President, submitted last week to Congress by President Eisenhower.

"How economic activity will move in the coming months cannot be confidently foreseen," the report states. "But the likely direction of movement of certain major categories of expenditure and demand is suggested by the facts now available."

Here are some important points made in the report:

Indications are that business capital outlays will rise moderately in the months ahead. Orders for durable goods have been exceeding sales, so that unfilled orders, particularly those for industrial and electrical machinery, have continued to rise.

Business plans for capital spending in 1957 will increase, but at a lower rate than in 1956. This is because some of the major programs now under way will be completed this year.

The report concedes that "financing considerations have prompted the postponement of some projects. And further increases in output of capital goods will be inevitably limited by the fact that some of the industries producing capital goods are themselves operating at or near capacity rates."

**Government Spending**

State and local government expenditures are expected to continue to increase. Federal spending will also be higher, as was indicated in the budget message submitted earlier. Increases in institutional building are also expected.

Some uncertainties are also admitted. One is the upward movement of prices.

### USS Supply Prexy

John H. Morava has been appointed president of U. S. Steel Supply Div., U. S. Steel Corp., effective Feb. 1. He succeeds Leslie B. Worthington, recently elected president of Columbia-Geneva Div., U. S. Steel.

Mr. Morava had been manager of the Corporation's Chicago sales office. He joined U. S. Steel in 1930.

### May Probe Scrap Exports

A Congressional investigation of the effect of booming exports on the price of ferrous scrap may be building up.

Rep. Wright Patman, D., Tex., wants the House Small Business Committee to conduct the probe. Patman complains that foreign buyers placing large orders for scrap in this country, "have driven the prices up so high that small businessmen can't afford to buy it."

Rep. Patman, whose district includes the site of the Lone Star Steel Co., promised the probe as the House considered whether to continue the Small Business Committee in the new Congress.



## Purchases:

**Some see inventories high; blame ordering drop.**

Most purchasing agents think their January inventories are about right. Thirty pct believe they are too high. Only 8 pct say inventories are too low.

A survey by the National Assn. of Purchasing Agents points to a temporary drop in new orders and production for a build-up in stocks. This is the third straight month in which the study indicated inventories of purchased materials to be approaching "normal."

Concerned by price increases and inflation, the purchasers are attempting to keep down supply costs. They feel the effort to keep their companies in good competitive position is being frustrated by advancing prices.

**Short-Term Thoughts**

Prices have resumed their upward trend, the purchasers report. Almost three-fourths of those questioned say they are paying more for what they buy; and none say prices are lower. A number feel that while tight money creates problems, it's good for the nation.

Purchases of production materials are definitely being limited to the short-term. Some 66 pct of reporting members indicate they are keeping commitments to 60 days or less. Only in cases where items are in short supply or where longer lead time is required by mills are schedulings being made 90 days ahead.

On the optimistic side, a modest upturn in new orders is indicated, with 32 pct reporting their position as improved. This compares with only 24 pct who described themselves in a better new order position in December. The number listing a decline in new orders is down—it's only 23 pct this month as opposed to 31 pct in December. Also production remains high as 28 pct see it better than in December.

AUTOMATION

# PAPERWORK: Cut Down By Punched Cards

**Ford Motor Co. installs a central information center in its steel mill . . . Tabulating equipment records pertinent information on punched cards . . . Saves $150,000 in first year.**

◆ IN LESS THAN two years, the Steel Div. of Ford Motor Co. fought its way from under an avalanche of paperwork. The weapon: a unique punched-card system.

Realizing the amount of paperwork was growing beyond reasonable bounds, the division's management studied its problem, learned that duplicated clerical effort, out-of-date reporting forms, too much unrelated basic data, and not enough timely control information contributed to the conditions. Then they went to work.

In addition to normal complexities of systems revisions, the task was complicated by the fact that necessary action cut across the entire organization — line and staff. This, of course, required a fine degree of coordination and cooperation between departments.

### For Each Piece

Clerical routines were overhauled and unnecessary reports scrapped. A highly mechanized infomation center was set up in the heart of the mill. Tabulating equipment was installed. Information fed into the center was recorded around-the-clock on punched cards.

Now a card is prepared for each ingot, slab, and band produced. And as steel progresses from operation to operation the card for each individual piece progresses through the file.

The Division estimates that it has saved $150,000 in the year the revamped system has been operating.

To get information into the center from various parts of the mill, Ford uses some unusual industrial communications devices. Among them are wirephoto facsimile units that require no added clerical effort on the part of weighmen or production recorders on the mill floor.

Multiple receivers in the center do not require monitoring. Therefore, the work load is spread evenly throughout the day eliminating peak loads at the end of shifts.

### Shipping Too!

Wirephoto facsimile units are also used between shipping docks and the central shipping office.

Information concerning order status and shipping instructions flows to each shipping dock. Loading details likewise are transmitted to the central shipping office, forming a basis for preparing shipping documents.

Since production and consumption reporting is made on an hourly basis, the files always reflect a current picture of steel in process. Orders are also recorded permitting a mechanical blending of this information with material in process.

A final step in the mainline processing routine mechanically correlates order status with inventories to indicate production needs as a basis for daily mill schedules. It serves as a basis for accepting new orders to regenerate the cycle, Ford says.

Next step will be the introduction of electronic computers.

## Punched Cards Make The Difference

**■ When the Steel Div. of Ford Motor Co. records production and inventory information on its new punched card system, the facts on file are also used for subsidiary reports. It adds greatly to the value of the system. Some of the subsidiary data obtainable within each of the five main reporting areas:**

| Basic Punched Card Information | Subsidiary Reports |
|---|---|
| **Production** | Daily yield.<br>Performance for incentive payroll for budget activation.<br>Product cost analysis. |
| **Quality Control** | Rejects for disposal cause.<br>Reject history by type of steel for adjusting requirements. |
| **Shipping** | Summary invoicing.<br>Shipping statistics.<br>Sales and profit analysis. |
| **Orders** | Order status for customer inquiries.<br>Age analysis for expediting.<br>Projected work loads. |
| **Inventory** | Location and age of material.<br>Surpluses.<br>Classification by type.<br>Cars in transit.<br>Storage performance in keeping like materials together. |

A Multipress case study

*Small lot production of intricate electronic parts is performed quickly and economically on this Denison hydraulic Multipress.*

# MULTIPRESS® speeds electronic parts assembly at General Radio

**The Problem:** Planning a production set-up for a company that averages a new, complex electronic instrument every month, in production lots ranging from 50 to 100,000 units.

**The solution:** Denison's versatile hydraulic Multipress.

General Radio Company of Cambridge, Mass., a leading designer and manufacturer of electronic test equipment, finds Multipress capable of automatic operations on volume runs, yet efficient when manually operated for small lots.

Small lot production costs have been reduced substantially. Operator safety is at peak levels. Smooth, precise pressure control produces uniform assemblies despite thickness variations in stock materials.

These Multipress benefits are typical. To find out how Denison hydraulic power can lower costs, speed production and improve quality for your company, consult a Denison hydraulic specialist. Write Denison Engineering Division, American Brake Shoe Co., 1242 Dublin Road, Columbus 16, Ohio.

DENISON HydrOILics

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

ATOMIC ENERGY

# ATOMS: Tiny Nuclear Battery

**Thumbtack-size device will deliver electrical power for five years . . . Not yet available commercially, it will eventually power devices such as wrist watches.**

◆ A REAL Dick Tracy device, a miniature nuclear powered battery, is now an actuality.

The new battery, a joint development by Elgin National Watch Co. and Walter Kidde Nuclear Laboratories, is capable of delivering continuous electrical power for at least five years.

The new device, approximately the size of the head of a thumbtack, has a nominal power output of 20 microwatts. It is the first such device to be completely safe for extensive personal use without special precautions, according to its inventors.

### Power Source

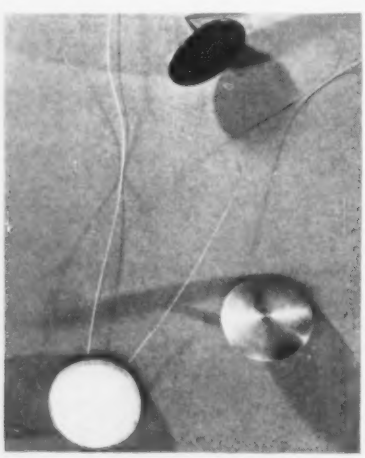
The battery utilizes the decay energy of a beta-emitting radioisotope as its source of energy.

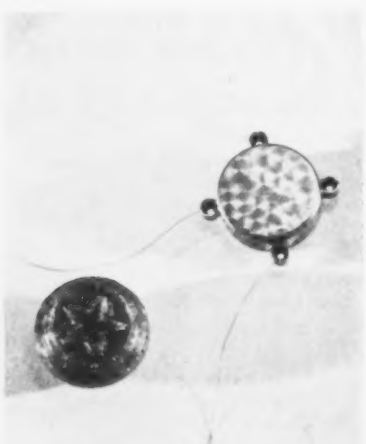
Operation of the battery depends on a two-step conversion of energy. From beta emissions to light and from light to electricity. The light source consists of a mixture of finely divided phosphor and an oxide of Promethium 147, one of the most abundant nuclear fission products. Beta particles emitted by the Promethium are absorbed by the phosphor and converted into red and infra-red light. This light is captured by two or more photocells and transformed into electrical current.

### Not for Sale Now

Although not yet commercially available, the battery will eventually be used in such products as hearing aids, miniature portable radios and civil defense warning receivers for the home. Robert C. Miller, Elgin's manager of physical research, also predicted the battery will some day be used for an atomic-powered wrist watch. The inventors stress it is as safe to carry as a latchkey.

Both Elgin and Kidde indicate that the initial commercial use for the miniature unit will be in transistorized circuits.





TINY, atomic-powered battery, without its metal shield, is no bigger in diameter than the head of a thumbtack. With the shielding, it is comparable in size to a cough drop. Yet, its developers report, it is capable of delivering usable electricity for as long as five years.

## Business Spending Big

In the years from 1947 to 1956, inclusive, business spent over $250 billion on new plants and equipment. The large outlay has been one of the major factors contributing to the high rate of economic activity.

This is disclosed in an analysis of the ten year period by the Office of Business Economics, Dept. of Commerce, publication "Survey of Current Business."

Manufacturers and public utilities invested $104 billion and $36 billion, respectively. Commercial and communications companies laid out $78 billion in the same period.

For 1956, businessmen forecast that they expected to spend $35 billion, 22 pct above their 1955 expenditures. Preliminary result of the year indicates actual spending was close to the earlier forecast.

## Unloader For Gary

The Wellman Engineering Co., Cleveland, will build a Hulett ore unloader for installation at the Gary Works, U. S. Steel Corp.

Rated capacity of the unit will be 20 tons per bite. New features on the Hulett will include worm-driven trucks, to replace the old line-shaft drive arrangement.

U. S. Steel will supply special alloy steels for use in the unloader where added strength and resistance to abrasion are desired.

## African Manganese

Vanadium Corp. of America, N. Y., has been granted manganese concessions on 2460 sq mile tract called the Chilili East Manganese Area, in Northern Rhodesia.

The property is located near a 200 sq mile concession purchased by Vanadium Corp. in 1955, which now supplies about half of the company's requirements.

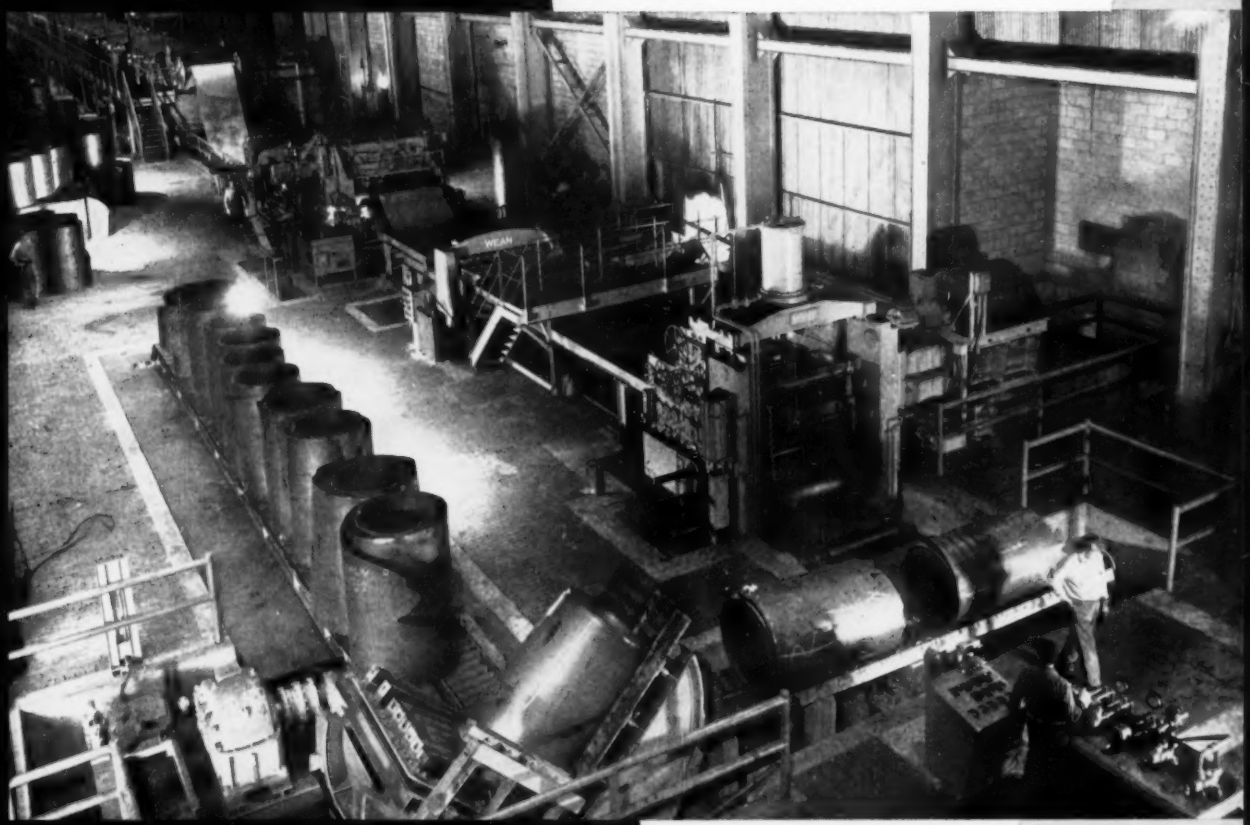
Geological work on the new area will be accomplished by Rhodesian Vanadium Corp.

## New Gas, Liquids, Too

Proposed expansion for the Air Reduction Pacific Co. plant at Seattle, would triple capacity of oxygen and nitrogen gases and permit this subsidiary of Air Reduction Co., Inc., to produce liquid oxygen and nitrogen as well as argon gas.

HOW WEAN CREATIVE ENGINEERING

# improves continuous Strip Pickling

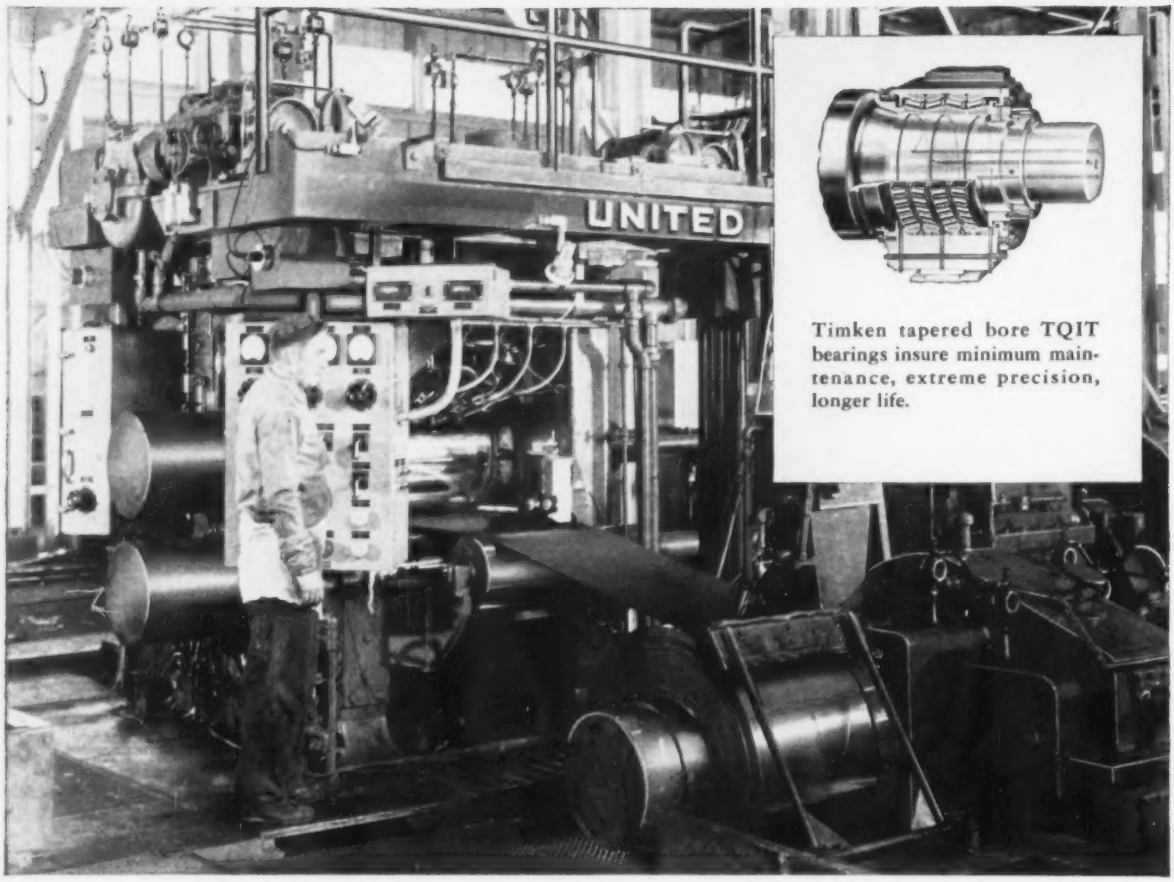


FASTER, more uniform pickling at reduced costs — that's why leading steel producers prefer Wean Continuous Strip Pickling Lines. From the McKay Processing Uncoiler to recoiling, the Wean line is engineered to deliver highest quality at greatest speed.



WEAN

THE WEAN ENGINEERING COMPANY INC., WARREN, OHIO






Timken tapered bore TQIT bearings insure minimum maintenance, extreme precision, longer life.

# 2-High temper pass mill starts faster runs smoother on TIMKEN® TQIT bearings

THIS 2-high temper pass mill, built by United Engineering and Foundry for Alan Wood Steel Company, uses tapered roller bearings of the TQIT type, designed and developed by The Timken Roller Bearing Company.

Higher mill speeds are possible with Timken® bearings. They reduce starting resistance. That's because Timken bearings practically eliminate friction. Their geometric design gives them true rolling motion. Precision manufacture makes them live up to their design. All this makes for smoother, more dependable operation.

Timken tapered bore bearings combine interference fit with easy removal. They can be removed from the roll neck by expanding the cones hydraulically. Excessive scuffing and neck wear are eliminated. Greater stability between cones and roll neck distributes the load within the bearing. Improved fillets and larger necks are possible. This means you get the lowest possible neck stress and deflection.

Lubricant costs are cut because Timken bearings use economical grease lubrication. No lubricant is lost during roll changes. And rolls can be changed faster because there are no tubes or pipes. The tapered design of Timken bearings lets them take radial and thrust loads in any combination—no need for special thrust bearings that increase costs and complicate designs.

Be sure you get all the advantages of Timken TQIT bearings in the machines you buy or build. For more information call or write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

*This symbol on a product means its bearings are the best.*

TIMKEN

TRADE-MARKS REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD

# REPORT TO MANAGEMENT

### What's All This Scare Talk About?

It happened about the same time last year. A few auto cutbacks, a slow housing market, some guarded pessimism from a few business people. Then the scare talk started.

**It was pointed out then** by most realistic businessmen and responsible government officials that there was little to worry about. As it turned out, 1956 was about the best business year in history.

**History is repeating itself** this year. It's true that there are some soft spots. But there will be those every year. Responsible business people again reassure the jittery that a decline in the rate of climb is far from a depression.

**The real truth is that** even the genuine, congenital pessimists aren't worried about 1957. What they're really talking about when they refer to "last half letdown" is some inward worry about 1958.

**You'll have to admit that** 1958 is still too far away to be absolutely sure of anything. A lot depends on intangibles that aren't in the picture now.

### What the Indicators Point To

But coming back to today, the regular indicators of the nation's economic health are all good. The Dept. of Commerce's latest set of readings shows little but the best.

**Disposable personal income** for the fourth quarter of 1956 was about 5.5 pct above a year ago. And higher income has been, and still is, the principal factor in generating consumer demand.

**Employment itself is** at a high level—more than a million above the same time a year ago. In November, the latest month tabulated, new orders and sales were at a record high. In durable goods industries, unfilled orders were nearly 20 pct over a year ago. The level is about the same today—possibly higher.

### More Credit for Small Business

It's expected that the Small Business Administration's request for more funds and authorization to make more business loans will get speedy approval.

**One of the most significant** aspects of the tight money market is the zest with which small businessmen have taken advantage of the SBA's credit help.

**SBA Chief Wendell Barnes** points out that SBA's business loan volume has been almost twice that anticipated.

**Volume has grown at a rate** that closely parallels the tightening money market. And the need for credit is no indication of poor business. The agency's rate of approval was 48 pct in the last half of 1956. This compares with 50 pct in the first half—but with only 41 pct in the last half of 1955.

**Need for financing is apparent** in volume of applications. SBA loans were sought by 3337 companies in the last half. This compares with 2578 in the preceding half and only 1503 a year earlier.

### Consumer Credit Works Both Ways

It's noted in one government report that the rate of climb of consumer credit has slackened in the past year. This is attributed to lower auto sales than the year previously.

**But it's possible that it could** work the other way. Some authorities think that the difficulty in obtaining credit helped contribute to poor auto sales. Take your choice.

# INDUSTRIAL BRIEFS

**Brussels Sprouts** . . . An analog computation center will be opened in Brussels, Belgium, during 1957 by Electronic Associates, Inc., Long Branch, N. J. The center will provide the latest types of electronic analog computers and a staff of scientists for problem analysis and programming. The equipment and staff of this center will be available for rental on an hourly, weekly, or monthly basis to the various companies in Western Europe.

**German Giant** . . . Phoenix-Rheinrohr AG. of Dusseldorf, West Germany's Ruhrort plant, has put into operation a $7.5 million giant blast furnace. It took 16 months to build the furnace, its height is 250 feet. With this addition the company's capacity will be increased by 30,000 tons of crude iron per month. Average monthly production is more than 200,000 metric tons.

**Around the Globe** . . . Globe Metallurgical Corp. and Interlake Iron Corp. have merged. It follows the acquisition by Interlake of more than 99 per cent of Globe Metallurgical stock, through exchange offers. Globe Metallurgical of Beverly, O. produces ferroalloys used in the manufacture of stainless and alloy steels. Interlake is a leading producer of merchant pig iron.

**On The Range** . . . The Colorado Fuel & Iron Corp. has installed production facilities for the manufacture of Cal-Tie Wire at its Pueblo, Colo. plant. Cal-Tie Wire, a special steel wire product for tying reinforcing bars and other construction tying jobs, was originally developed at CF&I's Pacific Coast Div. Since June, 1955, it has also been manufactured at the company's Wickwire Spencer Div. plant in Buffalo, N. Y.

**What Interest Rate** . . . The Atomic Energy Commission has approved three loans, each of 5,500 lb of natural uranium metal, plus neutron sources, to North Carolina State College, Ohio State University, and Rensselaer Polytechnic Institute. The uranium and neutron sources will be used in subcritical assemblies for the training of nuclear engineers.

**The Heat's On** . . . A new vacuum equipment section at the Industrial Heating Div. of Westinghouse Electric Corp., Meadville, Pa., has been formed. The new equipment section will build two new types of electric arc melting furnaces among other products.

**Cross Over** . . . General Electric Co. has established an Advanced Semiconductor Laboratory to bridge the gap between basic research and semiconductor product engineering. Dr. Harris M. Sullivan has been appointed manager of the laboratory, which is located at Electronics Park, New York.

**Hear This** . . . The Bureau of Aeronautics of the U. S. Navy has awarded a contract for approximately $16 million to Temco Corp., Dallas, Tex., for design and development of a new guided missile weapons system. This contract marks the third prime contract to be awarded Temco by the Navy in less than seven months.

**Quick on the Draw** . . . A training school to teach proper handling of Ramset powder-actuated fastening tools is being started by Ramset Fastening System, of Olin Mathieson Chemical Corp. Each course will last for three days and new classes will start every other week at the company's headquarters in Cleveland where a special training room has been built.

**Acaćemy Award** . . . Consolidated Electrodynamics Corp., Pasadena, Calif., was awarded a "Certificate of Management Excellence" by the American Institute of Management. Consolidated won the AIM recognition for the third consecutive year for "conforming with sound management standard in every category studied."

**Radiation Station** . . . Stanford Research Institute is expanding its radiation research facilities with the acquisition of a 1-mev. G. E. resonant - transformer electron-beam generator. The new facility is being acquired to carry out SRI's radiation program which is expected to exceed $1 million for 1957.

**Taking Over** . . . Fabricated Steel, Inc., Hamilton, O., has been acquired by Henry A. Rentschler and a group of associates through a substantial stock interest. Mr. Rentschler has been elected to the board of Fabricated Steel, Inc. and appointed vice president.

# Self-aligning

## FOR LONGER LIFE

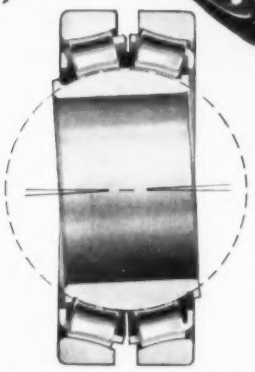
**Not even misaligned shafts or supports impair the efficiency of this easy-to-mount LINK-BELT roller bearing**

THE equipment manufacturer seeking lower manufacturing costs plus the ultimate in free-rolling efficiency need look no further than this Link-Belt roller bearing.

- **SELF-ALIGNMENT** compensates for inaccuracies in machining and assembly of equipment.
- **EASY MOUNTING.** Bearing is securely and quickly locked by a heavy collar to commercial shafting.
- **COMPACTNESS** offers design flexibility.

You'll find equally important economies throughout industry's most complete line of ball and roller bearing blocks. Ask any one of 40 Link-Belt offices or your authorized stock-carrying distributor for Book 2550.

Series 400 roller bearings

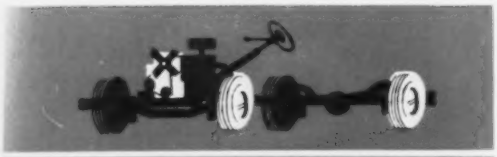


**FREE ROLLING—SELF ALIGNING.** Spherical inner ring aligns freely in any direction. Load is distributed over entire roller assuring full capacity. Destructive edge loading cannot occur.

**LINK-BELT**

**self-aligning ball and roller bearings**

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.440



AUTOMOTIVE ASSEMBLY LINE

# Auto Sales Buck Seasonal Trend

**Even though winter sales are traditionally slow, dealers are selling new cars at a rate of 500,000 a month . . . Showroom inventories average 33 days supply . . . Ford, Dodge, DeSoto doing well—By T. L. Carry.**

◆ ONCE AGAIN the professional pessimists in Detroit are having a field day. Recently, they have been pointed to the numerous small cutbacks in auto production as a sign that the industry is going to suffer.

Early forecasts of an annual production of 6.5 million cars this year, it is claimed, were too optimistic. Indications now are, it is added, that if the industry puts out 5.8 million cars it will be a remarkable accomplishment.

**Cutbacks Analyzed** . . . It is true that there have been cutbacks in auto production of late. The schedules have been trimmed somewhat in GM's medium price line—Buick, Oldsmobile and Pontiac. Even Chevrolet, the traditional leader in the industry, lost out to Ford in the first 10 days.

Mercury, another medium price contender, has just recently cut its schedules back. Not because the cars aren't selling but because the schedules were too high.

Dodge and DeSoto have been doing very well. Production figures for the month of December show that both makes increased their output by at least 2000 units more than the same period in 1955.

Sales figures for the first 10 days of January show that there were slightly less cars sold than for the same period in December. It is expected that registrations during the second 10 days of this month might be even slightly lower.

**A Look At Inventories** . . . But dealers are still selling cars at the rate of about 500,000 per month. And this is during a time of the year when sales are traditionally slow.

Still another factor to be considered is new car inventories.

As of the end of December new dealers had on the average a 27-day supply of cars. It is estimated that by the end of January the day-supply figure will have reached 30 days. It's possible that by the end of February dealers could have a 33-day supply.

This is not at all bad. A normal dealer supply of cars is considered about 30 days. But at the rate new cars are selling so far, 33 days would not be unusual.

So far, this year is in no way similar to 1956. Remember that at this time last year dealer stocks were pushing close to the 800,000 mark. Cutbacks that followed were mostly to cut the stocks. This year, the minor cuts in production that have been made in most cases are merely to adjust to a seasonal slump in sales.

Steel buying patterns in the

## Aluminum Tries Out For Cooling

CONVENTIONAL LOOKING radiator under examination by Michael P. deBlumenthal, Studebaker-Packard chief research engineer, is somewhat more than conventional. It is a new aluminum-finned type being tested for better cooling and longer life. A thousand 1957 Studebakers in various parts of the country are equipped with it.

# "A wing and a prayer" ...and plenty of nuts and bolts!

ABOUT A THOUSAND assorted nuts and bolts keep this airborne performer in one piece despite the beating it takes show after show.

Obviously, the fasteners that keep the parts together have to be strong and flawless to stand up under the terrific stresses.

They do a big job, these standard fasteners. Take the automotive industry alone – over *10 billion* fasteners used last year!

**RB&W—A MAJOR SUPPLIER TO INDUSTRY**

A leader in the field for over 111 years, RB&W turns out the finest fasteners possible to meet the insatiable needs of automotive and other major industries.

*Modern facilities, new techniques, long experience* . . . all combine to make RB&W fasteners truly the "strong point of any assembly."

**SEND FOR THE RB&W "FASTENER MAN"**

If the product you make is assembled with fasteners, chances are the RB&W "Fastener Man" can find a way to save you money. He can recommend and supply the right standard fastener for just about every job. Contact your nearest RB&W office.

RB&W

111th year

**RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY**

**Plants at:** Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; **Distributors from coast to coast.**

**RB&W FASTENERS - *Strong Point of any assembly***

ONE OF A SERIES . . .

# What makes a cylindrical roller bearing good?

## SUPERIOR QUALITY of INNER RACES

**The function of an inner race is to provide a fatigue-resistant surface between a shaft and the bearing rollers. Because of roller bearing geometry, there is a smaller area of contact between inner race and rollers than between outer race and rollers. This concentrates more load on the inner race and makes it the critical member from a fatigue life standpoint, particularly when the inner race is the stationary member and maximum load is repeatedly applied at one point.**

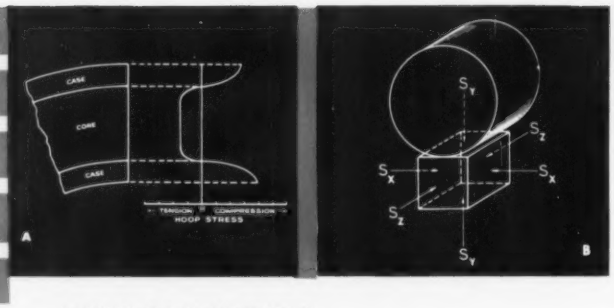
**Since it is vital to good performance that the inner race does not work loose on the shaft, HYATT inner races are designed for relatively heavy press fits, so the inner race becomes an integral part of the shaft for all practical purposes. Other advantages of HYATT'S carburizing process and precision finishing operations are briefly explained at right.**

**You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your design requirements. Remember, HYATT is America's *first* and *foremost* maker of roller bearings. Hyatt Bearings Division of General Motors Corporation, Harrison, New Jersey.**

GM GENERAL MOTORS

**HYATT**

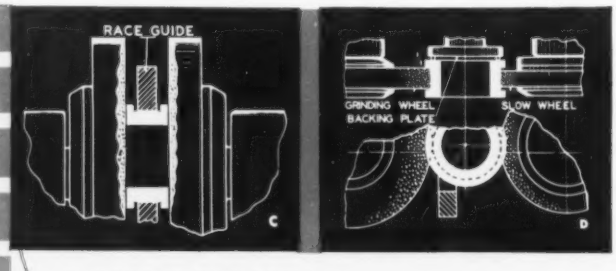
**HY-ROLL BEARINGS FOR MODERN INDUSTRY**




### 1. WHY CARBURIZING?

Carburizing provides inner races with tough cores, and flanges that will not crack, with no loss of case hardness. This permits tight press fits and also improves load-carrying capacity as shown in Diagram A. During quenching, a volumetric change tends to stretch the core and compress the case. Due to the Poisson effect, the compressive hoop stresses in the external fibres build up the load-carrying capacity.

Diagram B shows a typical element under roller load. Stresses in the "Z" direction are negligible; those in the "X" direction are compressive hoop stresses or pre-load. Those in the "Y" direction are compressive stresses due to the load. Without the compressive stress Sx (hoop stress) the load capacity would be reduced; and if "X" were a tensile stress due to pressing a through-hardened race on a shaft, the bearing capacity would be still less.

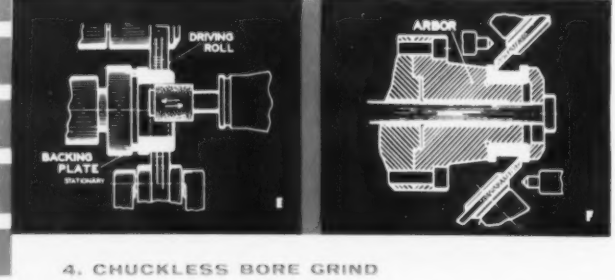



### 2. DOUBLE END GRIND

In grinding a HYATT inner race, the ends are first faced off square and parallel so they can be used as accurate reference during subsequent operations. The HYATT double end grind process (Diagram C) insures excellent control of parallelism.

### 3. CENTERLESS PATHWAY GRIND

Centerless grinding was pioneered by HYATT years ago, and eliminates excessive wall variation due to spindle and chucking errors. This method produces as nearly a perfect cylinder as is commercially practical. Two-point and three-point out of round and taper are held to a minimum. Note how work is rotated with backing plate against previously ground end (Diagram D) to insure accuracy.




### 4. CHUCKLESS BORE GRIND

Here the centerless method assures a bore concentric with the pathway, with minimum wall variation, by removing stock from high spots as they pass between drive roll and related grinding wheel (Diagram E).

### 5. FLANGE GRINDING

To assure that they will run true with roller pathway, flange faces are also ground using the squared ends for reference (Diagram F). This establishes even contact with roller ends during bearing operation.

**U. S. Automotive Production**

| WEEK ENDING | CARS | TRUCKS |
|---|---|---|
| Jan. 26, 1957 | 145,775 | 21,975* |
| Jan. 19, 1957 | 145,761 | 22,151 |
| Jan. 28, 1956 | 135,586 | 26,502 |
| Jan. 21, 1956 | 144,738 | 24,551 |
| TO DATE 1957 | 529,795 | 75,535 |
| TO DATE 1956 | 555,599 | 94,868 |

*Estimated. Source: *Ward's Reports*

auto industry have, however, been slightly affected. Every producer is striving for an ideal inventory situation this year. Automakers are trying harder than ever to adjust their buying patterns to actual production schedules and the inventory building that was the practice in other years is not evident now.

# Trucks:

### Ford Conference plots course for next eight years.

The trucking industry is perhaps one of the most overlooked businesses in the country, and yet it is one of the most important.

The 10 million trucks in this country traveled 120 billion vehicle-miles in 1956 to deliver 3 out of every 4 tons of freight that moved in the nation.

Almost 100 pct of all farm produce moves by truck at one time or another between the farm and the market.

Truck taxes pay for every third mile of highways in America. In addition, truck taxes will pay for 40 pct of the new super highway system which is presently being constructed.

These and many other facts were pointed out at a recent National Truck Conference sponsored by the Ford Motor Co. in nearby Dearborn.

There is no doubt that the trucking industry has come of age. The ease with which goods can be transported makes it possible for small communities not connected with rail lines to go industrial.

C. J. Williams, chairman of the board of the American Trucking Assn., cites a survey of the Asheville, N. C. area as an example of trucking's contribution to the new Southern economy.

Within recent years, 23 factories have located in Western North Carolina.

Nineteen of these plants receive 76 pct of their raw materials by truck, and also ship 77 pct of their finished products by the same means.

R. S. McNamara, Ford Div. general manager, says there are even greater things in store for the vehicles.

In 1957 alone, Mr. McNamara says, trucks and truck service will be a $1 billion business.

He predicts that within the next 10 years the nation's economy will break through the $500 billion mark. The need for trucks will increase accordingly. Production by 1965 will have increased 35 pct from its present rate to an annual rate of 1.5 million.

He is convinced that truck producers are in the midst of a growing shift to truck transportation. This trend presents a real challenge to the manufacturer.

As an example, gas turbine engines probably will be used in trucks before they are in passenger cars. One of the advantages of such a powerplant would be that trucks would be able to keep pace with the normal flow of traffic, thereby avoiding congestion.

## AUTOMOTIVE NEWS

To keep up with an ever expanding market, Ford is offering nearly 300 models in its 1957 truck line. They will be available with 27 engine options and 44 rear axles.

Ford claims that it didn't intend to bring out its present new models until 1958. The company moved its schedule ahead at an additional cost of $5 million in order to meet the needs of the industry.

### GM Foundry in Brazil

GM's Central Foundry Div. is presently preparing plans for a new foundry to be erected near Sao Paulo, Brazil this year.

Engine blocks and other gray and malleable iron castings will be produced at the site. The castings will be used in the production of trucks by GM's Brazilian subsidiary, General Motors de Brazil.

The new plant will cover 200,000 sq ft of floor space.

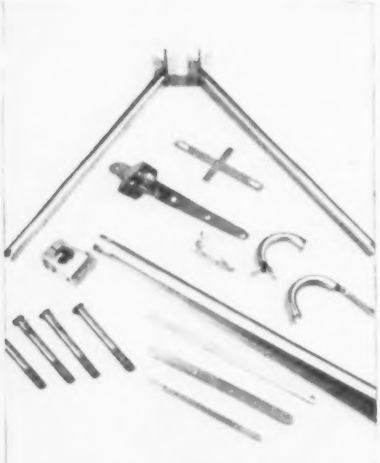
Due to the high cost of coke, initial melting facilities will consist of two electric furnaces and two holding furnaces.

**THE BULL OF THE WOODS** — By J. R. Williams

BAD SPOT TO PUT A FOREMAN IN--WHISPERIN' TO HIM RIGHT IN FRONT OF TH' BIG BOSS! TH' BULL OF TH' WOODS WILL NEVER KNOW WHAT TO THINK!
THAT'S JUST WHEN HE'LL THINK THE MOST! HE'LL BE THINKIN' THINGS LIKE "THEY'RE KEEPIN' SOMETHIN' FROM ME--THEY'RE MAKIN' FUN O' ME--THEY THINK I'M A FATHEAD--THEY'RE PLOTTIN' SOMETHIN'"--OH, I COULD GO ON AND ON--
THE FOOL
J.R.WILLIAMS
1-30

Progress with TITANIUM

# Over 1,000 years of salt water would whittle only 1/1000 of an inch off titanium



Marine fittings fabricated from Mallory-Sharon unalloyed titanium are immune to salt water corrosion, also offer substantial weight savings.

Salt water and marine atmospheres are traditional enemies of most metals. But not titanium. Its resistance to such corrosive attack is unchallenged. Tests show a corrosion rate so infinitesimal that it would actually take over a thousand years of salt water exposure to reduce the thickness of a titanium sheet by one-thousandth of an inch.

Titanium carries this exceptional resistance into industrial uses, where the economics of corrosion are also important. It is uniquely superior in resisting corrosion by such common industrial chemicals as nitric acid, solutions of chlorine, chlorinated compounds. Thus it more than pays its way in process vessels, piping, filters, heat exchangers, and many other places in processing industries.

Where can *you* use titanium to reduce the waste of corrosion? As a leading producer, Mallory-Sharon can help you evaluate titanium, help you "design ahead" with this exceptional metal. Write Dept. R-2 for complete information.

MALLORY Ti SHARON

MALLORY-SHARON TITANIUM CORPORATION • NILES, OHIO

*Producers of titanium and titanium alloy sheet, strip, plate, rod, bar, billets*

# How Long Will Tight Money Policy Last?

**Congress is going to take a long look at money policies . . . No immediate results are expected to ease tight money . . . Democrats want Congress to do its own investigating—*By G. H. Baker.***

◆ PRESIDENT EISENHOWER wants the Congress to take a long, hard look at the nation's financial system. As a result, "tight money" could be abandoned, but not soon.

There's to be nothing hasty about the kind of investigation Ike has in mind. It probably will take at least a year, maybe two. And both parties in Congress agree with the White House that a careful, painstaking, intelligent study of the nation's money machinery is about due.

**Who'll Do It . . .** Only question to be settled at the Capital in the weeks ahead is who'll undertake the study. Ike wants Congress to set up a special commission to do the job. Congress wants to do the job itself.

Nearly all Democrats and some Republicans in Congress are openly critical of the Federal Reserve Board's "tight money" policy. There is open grumbling that high interest and hard-to-get loans are slowing the rate of new construction, particularly home building. Retail sales, particularly sales of big-ticket items like stoves, washers, and other kitchen equipment, are suffering badly as a result of the tight credit policies.

**Past Results . . .** A broad inquiry of this type has not been made for more than 20 years. In 1910 and 1911, the House Banking Committee conducted a detailed money study, and one of the chief results was the establishment of the Federal Reserve Board. Again, in 1933, the Pecora Committee (of the Senate) made a parallel study and an important result was establishment of the Securities and Exchange Commission.

You'll find quite a few "easy money" Democrats in the cloakrooms of the Senate and the House today who are openly beating the drum for establishment of a new White House commission or board that would take over the control of money and credit from the independent Federal Reserve Board. Under this system, credit policies would be set by the party in power —not by the nonpartisan Reserve Board as has been the case.

**More Funds Coming . . .** Congress is taking steps to assure smaller firms of ample funds for the next five months. Both Senate and House members indicate they are in sympathy with a new White House proposal to raise the ceiling on small business loans (grand total) from $150 million to $215 million.

The Small Business Administration has almost run out of money. It tells Congress that demands for loans from small firms have all but cleaned out its treasury for this fiscal year (ending June 30). Although the great majority of Small Business Administration loans are so-called "joint participation" (SBA shares risk with local banks), the prospects for lending a financial hand to small firms are very dim unless Congress acts.

The Small Business Administration has granted more than 5000 loans to smaller firms in the fiscal year that started last July.

## Industrial Atomic Energy At Crossroads

**▪ Congress is getting ready to take a close look at the nation's progress in putting the atom to work industrially. Truth is that industrial uses of atomic energy are few and far between.**

**▪ Progress is slow. Congress wants to know why. Public hearings will be called upon from the Atomic Energy Commission, from business and industry, and from public power advocates.**

These are some questions to be raised:

**Why is commercial development of the atom lagging?**

**Is it because the government makes it too difficult for industry to put the atom to work for peaceful purposes?**

**Is it because commercial atomic energy is just too expensive to be used for non-government purposes?**

**Depending upon the answers Congress receives, industrial usage of atomic energy could move ahead rapidly in the next few years. Or it could languish and fall by default entirely to the government.**

# Hoots Mon!

**ye dinna want to**

**turn yer bock on this . . .**

# ADAHEARTH

**MINE IS 'CAUSE I BE COUNTIN' MA SAVINS AFTER USIN' ADAHEARTH . . .** a superior longer lasting refractory for forming monolithic hearths. ADAHEARTH . . . a chemically neutral, chrome base refractory with a plastic consistency . . . has unusually strong air-set; resists spalling, molten metal, and abrasion; has low porosity, high density, absolute homogeneity of structure . . . ADAHEARTH requires fewer man-hours to install . . . insures cleaner forgings and a faster-working furnace.

*Write for further literature . . . Yellow Pages of 'phone directory have your nearest "ADAMANT" Distributors.*

FOUNDED 1907

**Botfield**

**REFRACTORIES**

ADAMANT and other ADA products

swanson and clymer sts.
philadelphia 47, penna.

# Northwest: How Much Expansion on Way?

**With large-scale projects in the works, area could experience its best year yet . . . Shipyards, steel, aluminum, and aircraft are expanding . . . Bethlehem plans to install electric furnaces—*By R. R. Kay.***

◆ LUNCHTiME ECONOMISTS in the Pacific Northwest are talking over this one: How big and strong will the area grow this year? The question is not "Will it?" or "Won't it?"—but "How much?"

Most experts agree it could be the biggest year yet. So take note if your firm has a metalworking product or service. Hefty increases are in the works. Shipbuilding, natural gas, steel, aluminum, and aircraft all report big plans.

**Green Light to Boatbuilders** . . . Shipyards will hum with new naval work. These jobs should help get rid of the blues of the past few years. Work begins this summer on a Forrestal-class drydock at Puget Sound Naval Shipyard, Bremerton, Wash. Defense Dept. gave the green light for $25 million. When finished, the dock will cost over $40 million.

A $33 million project for two Forrest Sherman class destroyers will keep up to 1000 men busy. Puget Sound Bridge and Dredging Co. will do the job. The ships' speed and maneuverability are top secret. And in the coming months, the Maritime Administration will spend $6 million to $8 million reactivating ships in its Puget Sound reserve fleet.

**Gas is a Natural** . . . Historic turning point: Seattle's last plant for manufactured gas shut down, giving way to natural gas. Most believe the natural product is a must for further industrial expansion. Some 60 western Washington firms have already converted to it. Largest user is Bethlehem Pacific Coast Steel Corp. in Seattle. Its five openhearth furnaces will consume over 1.25 billion cu ft per year.

However, the days for these furnaces are numbered. A three-year project is now underway to replace them with two 100-ton electric furnaces.

**Piped to the West** . . . Another new pipeline is coming. West Coast Transmission Co. is planning to spend $55 million to bring Canadian gas to the Pacific Northwest.

It'll be a great year for Farwestern linepipe makers. Major producers have firm orders to keep their mills going through the entire year.

Aircraft production is now the state of Washington's No. 1 industrial employer. It has 50,000 workers vs 49,000 in lumber and wood products.

**Aluminum Needs Snow** . . . Over 100,000 Pacific Northwesterners pick up paychecks from the region's aluminum industry. And that number will grow during the year. The area's markets for the light metal are expanding. And the primary producers are pushing to the finish several projects to up output.

But there's one serious threat to the happy aluminum picture: shortage of snow. Washington mountains may produce one of the lowest spring runoffs in 10 years. Low water will mean less power generation.

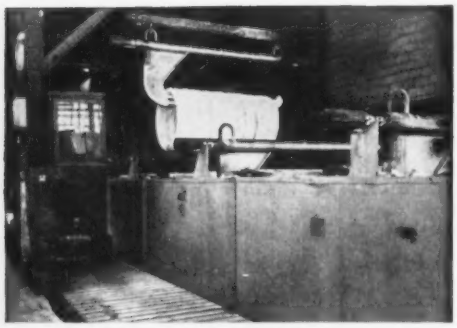
NEW JET TRANSPORTS developed by Boeing will be used by the Strategic Air Command of the USAF as high speed, high altitude, multi-purpose aerial tankers, personnel and cargo transports.

# NO PICKLING PROBLEM Too Large or Too Small

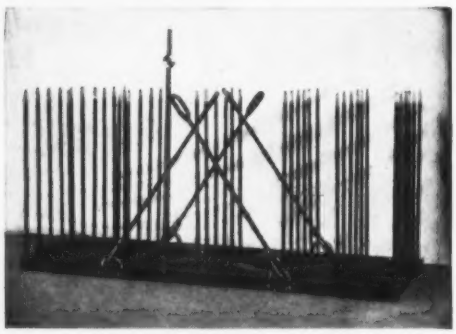
## WELDCO Specialists Handle Them All!

IN HUNDREDS OF PLANTS, you'll find Weldco equipment all along the pickling line. For Weldco products are made of corrosion-resisting, hot rolled metals, that withstand attack from hot acids and other pickling solutions. They are strong yet light-weight, wear-resistant, durable, and long-lasting. You get all these advantages when you specify Weldco hooks, mechanical picklers, crates, baskets, racks, chain, steam jets, and accessories.

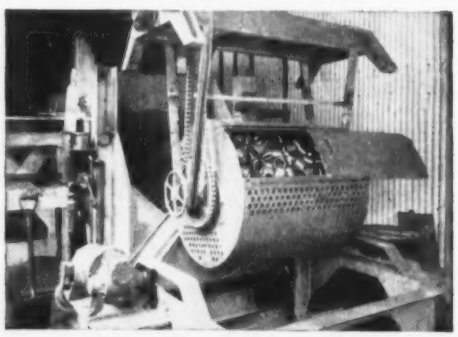
Weldco offers a complete, well-designed line of pickling equipment . . . plus the services of our experienced staff. Let Weldco engineers take care of all your pickling needs. For any problem, large or small, they have the practical, cost-cutting answer.



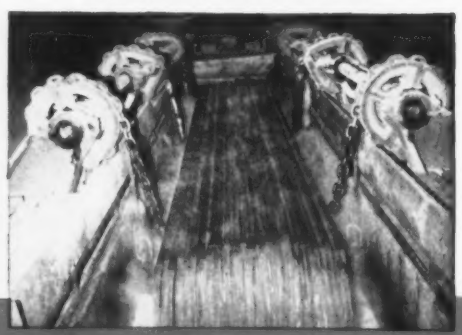
Weldco Pickling Hooks



Weldco Sheet Pickling Crate



Weldco Mechanical Drum Pickler



Weldco Monel Chain

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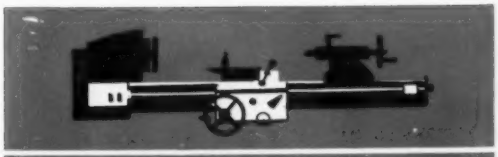



# Builders Confident in Long-Range Outlook

**1957 won't measure up to last year's record . . . But cutting tool makers are cheered by long-term trends . . . Current jitters over tight money and other economic factors hit orders—*By E. J. Egan, Jr.***

◆ NO DOUBT about it, last year was a big one for U. S. builders of metal cutting machine tools. But although the long-term trend for the industry looks very good, there's some doubt that 1957 will come up to 1956, either in shipments or net new orders.

Last year's shipment total was an estimated $886.4 million. That's 32 pct better than the 1955 figure, and an all-time, peacetime record, to boot. Actually, the 1954 total of $891.8 million topped this, but that can't be considered a bona fide peacetime year.

**What's Ahead** . . . In net new orders, the 1956 total of $923.9 million just missed getting in the books as a year-of-peace record. It was a shade under the 1955 figure of $927.1 million. That was the year of the Machine Tool Show in Chicago, which kicked off a buying wave that almost swamped builders.

Now comes the big question. Will 1957 measure up to 1956?

Well, what does the recent trend in shipments reveal? It's been going up, except for a slowdown in the summer quarter last year. To work off their post-Show bonanza and keep customers happy, builders cut the industry backlog from a high of 8.6 months in March, 1956, to a low of 6.2 months as they swung into 1957.

Now, take a look at the net new order trend since the big Show in September, 1955. Quarterly totals have dwindled from a high of $374.7 million in the last 90 days of 1955, to an estimated $187.5 million for the final 1956 quarter. It may be worth noting that December, with net new orders adding up to an estimated $57.1 million, was low month for the year.

**No Pessimism** . . . These things are what the "form sheet" shows. To most builders it indicates that 1957 won't be quite as good as the one just ended. None of them expect a bad year, and some predict that they'll sell and ship just as much as they did in 1956.

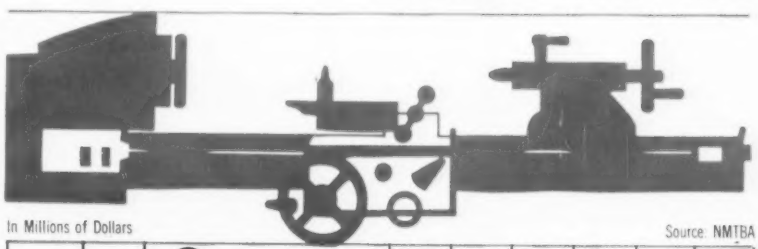
The reasons behind the "not quite as good" consensus are about what you'd expect. Slight but general concern about continuing inflationary pressure is one. Talk of a mild easing-off in automakers' production and expansion plans is another. The tight money curb on capital goods borrowing and spending in other customer areas is still another.

**Look at the Record** . . . It's worth emphasizing that builders are not in the least gloomy about 1957 prospects. Essentially, they see plenty of evidence to support an enthusiastic outlook.

They're used to all degrees of ups and downs from month to month and year to year. The big thing for most of them is that their metal cutting tool industry is even close to flirting with a $1 billion shipment or new order total in peacetime.

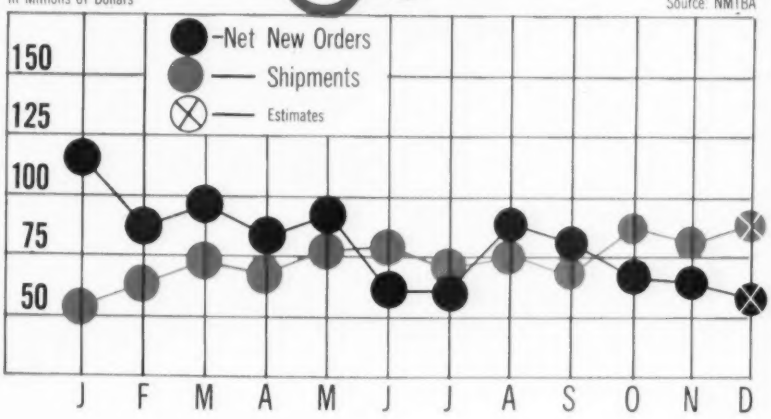
## MACHINE TOOLS 1956

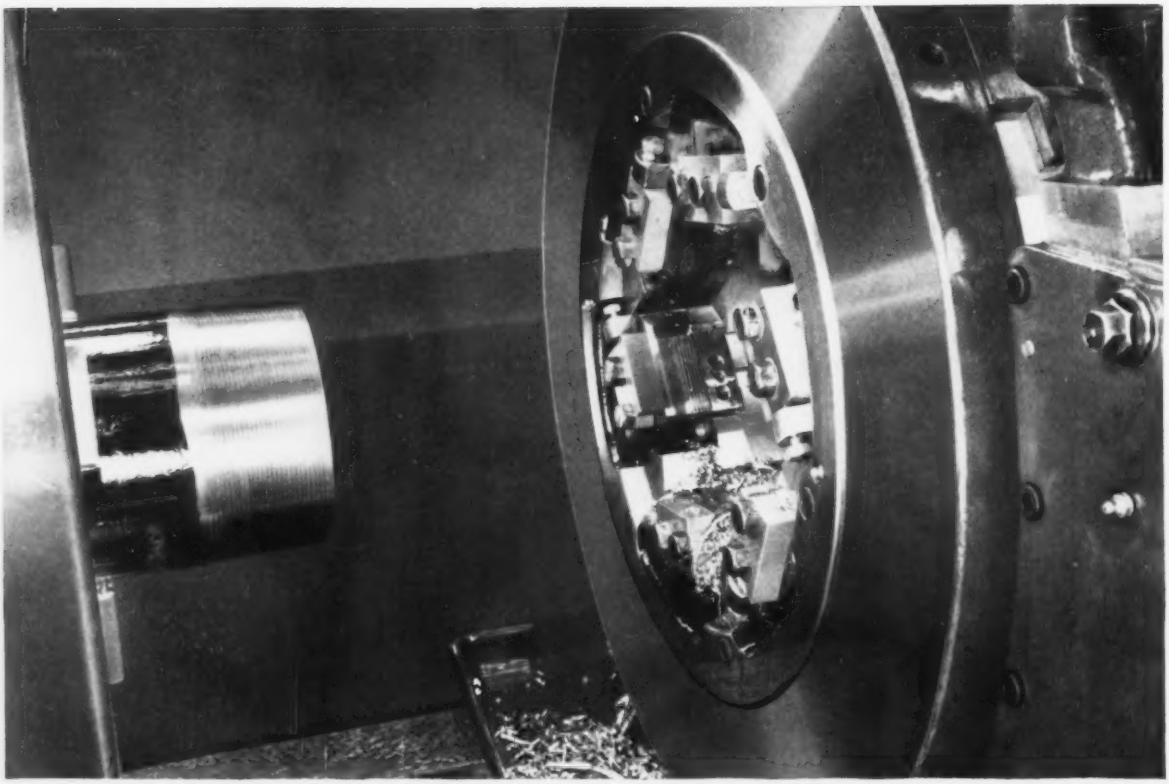
Metal cutting types only



In Millions of Dollars

Source: NMTBA





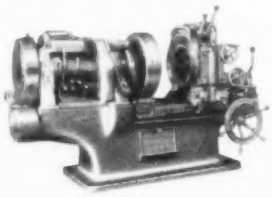
# LARGE TEXAS SHOP USES LANDIS PIPE MACHINES *Exclusively* . . . .

TEN LANDIS Receding Chaser Pipe Threading Machines are used by Atlas Pipe, Inc., largest mill-type pipe finishers on the Gulf Coast, for threading oil tubular goods.

These machines are installed in an offset position so as to permit uninterrupted production. Typical production figures show: the 4¾" machines threading 74 joints (148 threads) per hour from 2⅜" upset tubing—the 8⅝" machines averaging 20 joints (40 threads) per hour from 5½" casing. All threads are 8 pitch to API standards.

Mr. Becker, Plant Manager, highlights the important production advantages of LANDIS Pipe Machines when he says that they were selected for their flexibility, versatility, and the uniform threads produced. Thread uniformity is made possible by massive construction, leadscrew control of the carriage movement, a precision-built die head featuring LANDIS Tangential Chasers, and an attachment which mechanically controls the degree of taper.

These machines offer flexibility through wide range coverage—three sizes of machines (4¾", 8⅝", 13⅜") thread all pipe sizes from 1⅝" to 13⅜". Ease of set-up is also important — a change of diameter and length in less than two minutes, a complete change for diameter, pitch, taper, and length in 40 minutes.



LANDIS Receding Pipe Machines perform four other pipe fabricating operations in addition to threading: cutting off, chamfering, reaming, and the making and breaking of collars. For more information, write for Bulletin C-77.

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THE WORLD'S LARGEST MANUFACTURERS OF THREAD GENERATING EQUIPMENT

# The Iron Age SALUTES

***Dr. Ernest E. Charlton*** Former manager of the X-ray section at General Electric's research laboratory, he is a nationally-known authority on nucleonics and radiation. Wherever there are X-ray machines there is evidence of his work.

The quantity "X" has offered a lifelong series of challenges to Dr. Ernest E. Charlton, nationally-known authority on high voltage X-ray devices. For 36 years he has been meeting these challenges at General Electric Co.'s Schenectady, N. Y. research laboratory. Many of the mysteries surrounding X-rays have been solved, thanks to him.

Dr. Charlton's career includes 26 years as manager of the laboratory's X-ray section. During that time he directed development of many devices. One of the most important: a million-volt X-ray unit now used in hospitals for cancer treatment, in industry for detecting deep seated flaws in metal castings, and in laboratories to determine the atomic structure of materials.

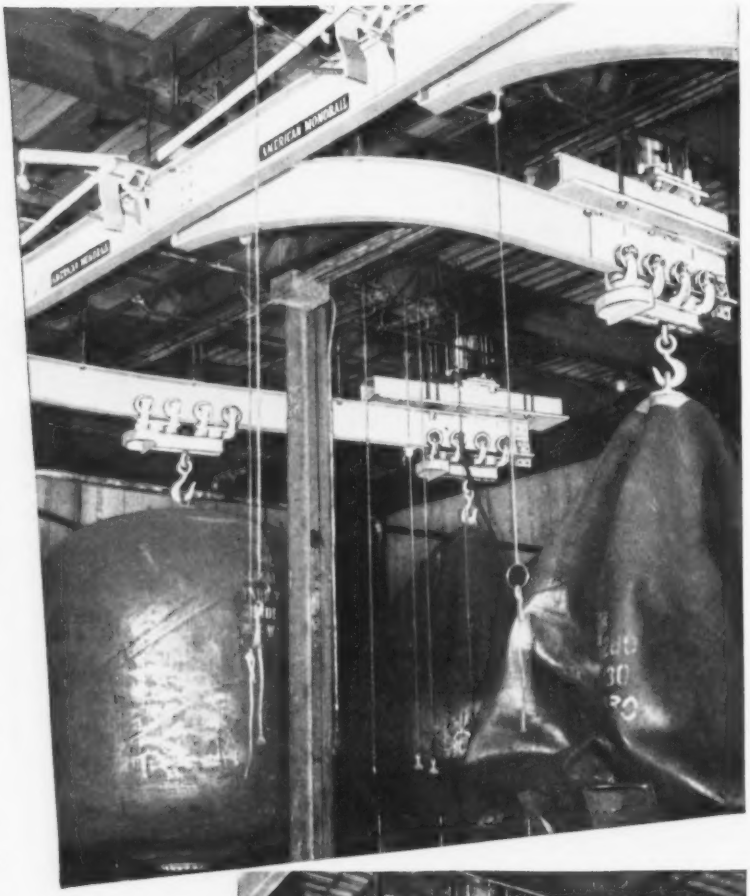
Another of his projects resulted in the one-million-electron-volt X-ray generator, a source of high energy electron beams used in studies of food sterilization and electron chemistry. Under his direction, the use of hard glass envelopes for X-ray tubes was introduced and came into general use. His list of accomplishments goes on and on.

Born in Meriden, Iowa, on Sept. 17, 1890, Dr. Charlton was graduated from Grinnell College in 1913. In 1918 he received his Ph.D. in chemistry from the University of Illinois. During 1918 and 1919 he served as a lieutenant in the Chemical Warfare Service, as instructor in chemistry at the University of Illinois, and as a staff member of E. I. du Pont Co. The following year he joined General Electric.

His investigations of the chemical problems of sodium lamps led him into electronics, where he soon came face to face with the ray "X." He has been chasing it down ever since.

In 1954, he was named the Mehl Honor Lecturer for the annual convention of the Society for Non-Destructive Testing. Last year, he retired as head of G.E.'s X-ray section, but he's staying on as a consultant. The reason is, of course, that all the mysteries of the X-ray are not yet solved.

# Teamed Engineering for EFFICIENT SEALDBULK HANDLING



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Send for Bulletin C-1.

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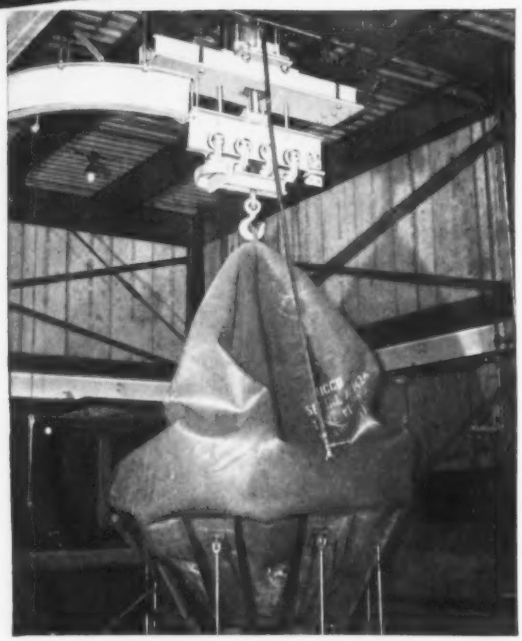

Member of Materials Handling Institute and MonoRail Mfrs. Assn.

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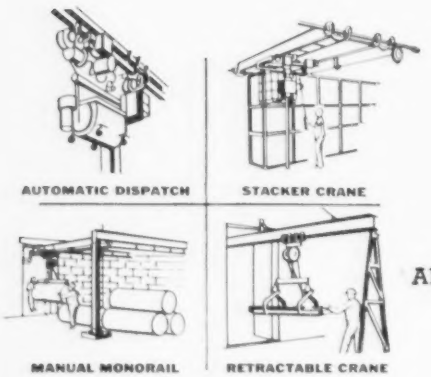


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DOUGLAS R. STARRETT, elected executive vice president, The L. S. Starrett Co., Athol, Mass.

# The Iron Age INTRODUCES

**John S. Coxe,** elected president and treasurer, **Alabama Metal Lath Co.,** Birmingham, Ala.; **Charles B. Webb, Jr.,** elected vice president and manager, sales; **C. Glenn Jones,** named asst. secretary.

**Manuel F. Diaz,** elected president, **Wesson Tool Co.,** Ferndale, Mich.

**Raymond C. Firestone,** elected president, **The Firestone Tire & Rubber Co.,** Akron, O.; **James E. Trainer,** elected executive vice president.

**David S. Leavitt,** elected president, **Leavitt Tube & Metal Co., Inc.,** Chicago.

**Ben Weiner,** elected vice president, sales, **Fischer-Fixman Metal Co., Inc.,** St. Louis; **Frank O. Putnick,** elected vice president, purchasing.

**Earl R. Frederiksen,** elected vice president, purchasing, **Jacobsen Manufacturing Co.,** Racine, Wis.

**Louis C. Edgar, Jr.,** elected executive vice president and director, **The Universal Wire Spring Co.,** Bedford, O.

**L. E. Dalton,** elected vice president, manufacturing, all divisions, **Kelsey-Hayes Co.,** Detroit.

**J. E. Lundy,** named treasurer, **Ford Motor Co.,** Dearborn, Mich.

**Loren J. Westhaver,** named executive vice president, Columbia-Geneva Steel Div., **U. S. Steel Corp.,** San Francisco, Calif.

**J. D. McCall,** elected vice president, Columbia-Geneva Steel Div., **U. S. Steel Corp.,** San Francisco, Calif.

**Fred O. Koch,** elected vice president, **Nooter Corp.,** St. Louis, Mo.

**John C. Dabney,** appointed director, marketing, **American Machine & Foundry Co.,** New York.

**James O. Dague,** named superintendent, Big Mechanical Dept., Lackawanna, N. Y. plant, **Bethlehem Steel Corp.**

**Frank Ray, Jr.,** named director, purchases, **Morgan Construction Co.,** Worcester, Mass.; **John J. Young,** appointed traffic manager.

**James E. Pierce,** named district sales manager, Pittsburgh, **Jones & Laughlin Steel Corp.,** Pittsburgh; **Ray G. Scoggins,** named manager, Hot Rolled Bar and Shape Product Div.; **William Miller,** named asst. manager, Tin Mill Products Div.

**Anthony J. Gizzi,** named manager, specialty resistor project, Metallurgical Products Dept., **General Electric Co.,** Edmore, Mich.

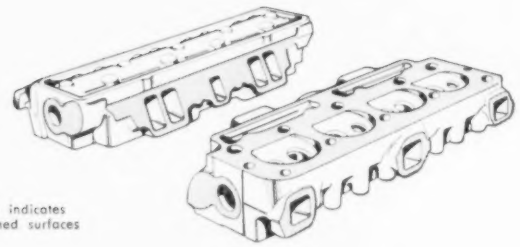
**Joseph R. Teagno,** named director, patent section, **Eaton Manufacturing Co.,** Cleveland.

EDMOND B. BUSTER, elected vice president and general manager, Cherry Rivet Div., Townsend Co., Santa Ana, Calif.

JOHN W. ROCKWOOD, elected vice president, Basic Inc., Cleveland.

WILLIAM H. PERKS, elected treasurer, and reappointed controller, Norton Co., Worcester, Mass.

# CUSTOMER SPECIFIED



Tone indicates machined surfaces

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**Russell A. Clayton,** elected vice president and asst. treasurer, **Kaiser Aluminum & Chemical Corp.,** Oakland, Calif.; **A. N. Warburton, Jr.,** appointed controller and asst. treasurer.

**Howard S. Thrasher,** named general sales manager, **The Seymour Manufacturing Co.,** Seymour, Conn.; **W. C. Shattuck,** named special sales representative, New York headquarters.

**C. S. Mushinski,** named superintendent, bar products, America's Park Works, **Crucible Steel Co. of America.**

**Harry Schoenfeld,** appointed manager, Philadelphia plant, **Cometals, Inc., of Pennsylvania.**

**R. D. Adams,** named director, sales, Steam Cleaner, Dynamometer and Chemical Divisions, **Clayton Manufacturing Co.,** El Monte, Calif.

**Andrew T. Fischer,** named marketing director, **Logistics Research Inc.**

**Adolphe J. De Matteo,** named general manager, Watson-Stillman Press Div., **Farrel-Birmingham Co., Inc.,** Roselle, N. J.

**G. P. Vest,** appointed manager, marketing, Medium Transformer Dept., **General Electric Co.,** Rome, Ga.

**Chalmers C. McElvain,** named asst. manager, Baltimore Works, **Armco Steel Corp.; Walter H. Roskott,** appointed works industrial engineer, Baltimore Works.

**Warren W. Brown,** named manager, sales and marketing, **Superior Foundry, Inc.,** Cleveland; **Norman Petitte,** named asst. sales manager.

**Arthur F. Bixby,** named manager, marketing research, Industrial Div., **Pennsalt Chemicals,** Philadelphia.

**Andrew J. Snow,** named sales manager, Furnace and Oven Div., **W. S. Rockwell Co.,** Fairfield, Conn.

ALBERT L. HOLLINGER, elected vice president, sales, all industrial divisions, Surface Combustion Corp., Toledo, O.

DONALD K. MARTIN, appointed sales manager, Steel Mill Div., Surface Combustion Corp., Toledo, O.

J. D. KENNEDY, named manager, industrial diamond section, General Electric Co.

GEORGE W. STAMM, named general manager, sales, Crucible Steel Co. of America, Pittsburgh.

**William H. Uren,** appointed operations manager, **Sahlin Engineering Co., Inc.,** Birmingham, Mich.

**Maurice R. Eastin,** appointed general sales manager, **Brush Electronics Co.,** Cleveland.

**Jack L. Mustard,** named sales manager, Industrial Div., **Ex-Cell-O Corp.,** Detroit.

**James H. Sutherland,** named director, sales, **SKF Industries, Inc.,** Philadelphia; **Edward H. Wagner,** named midwestern regional sales manager.

**Richard L. Lukey,** named appliance market sales engineer, Parts Div., **Reynolds Metals Co.,** Louisville, Ky.

**Robert G. Dee,** appointed general sales manager, ElectroData Div., **Burroughs Corp.,** Pasadena, Calif.; **J. F. Kalbach,** appointed field engineering manager.

**Lester W. Schaffer,** appointed regional sales engineer, **E. H. Titchener and Co.,** Binghamton, N. Y.

**Glenn B. Warren,** appointed consulting engineer, Turbine Div., **General Electric Co.,** Schenectady, N. Y.

**Nelson L. Llewellyn,** named division industrial engineer, Ideal Foundry Div., **Republic Steel Corp.,** Newton Falls, O.

**Thomas M. Rees,** is now affiliated with the **Stanley Berg Machinery Co.** in the sales of heavy machinery, Pittsburgh and tri-state area.

**T. L. Nabors,** appointed asst. chief combustion engineer, southern steel district, **Republic Steel Corp.,** Gadsden, Ala.

**Lynn Chapman,** named supervising methods engineer, Danville, Ill., factory **Hyster Co.**

**Bruce W. Thayer,** appointed manager, Chicago sales and service branch, Industrial Truck Div., **Clark Equipment Co.,** Battle Creek, Mich.

**Reynold C. MacDonald,** appointed division superintendent, **Kaiser Steel plant,** Fontana, Calif.

**Joseph A. Linesch,** appointed purchasing agent, **Consolidated American Industries, Inc.**

**Robert W. Wolfe,** named general sales manager, **New Process Gear Corp.; Thurman O. Ruettinger,** named chief engineer.

### OBITUARIES

**Alvah H. Warren, Jr.,** 69, former manager, structural and plate sales, **U. S. Steel Corp.,** Pittsburgh.

**Arthur C. Keene,** 45, vice president and general manager, **Wausau Iron Works,** Wausau, Wis.


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**HEAT-RESISTING STAINLESS**
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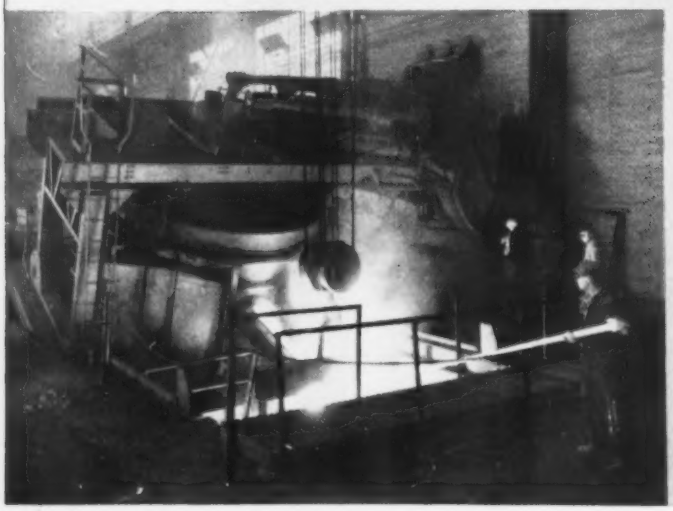

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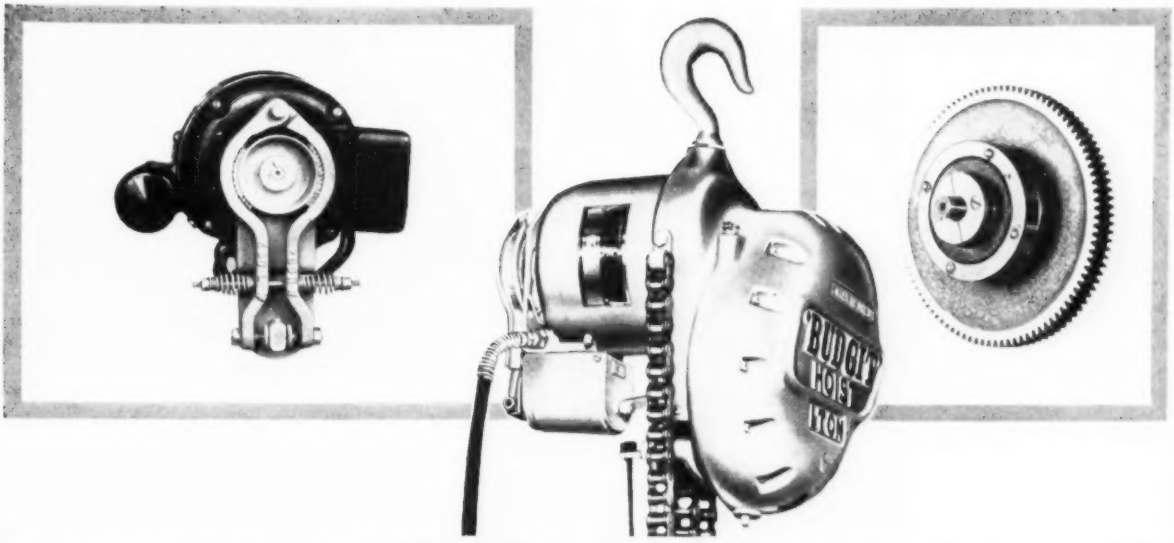
**Plant: New Castle, Ind.**

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Ruggedness, efficiency, safety and economy have made the 'Budgit' Electric Hoist the most widely used hoist in the world. Capacities: ⅛ to 2 tons. AC and DC models; also 12-volt battery-operated models for use on trucks. Prices start at $149. *Ask your "Shaw-Box" Distributor for details or write us for Bulletin 402.*

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57A-9

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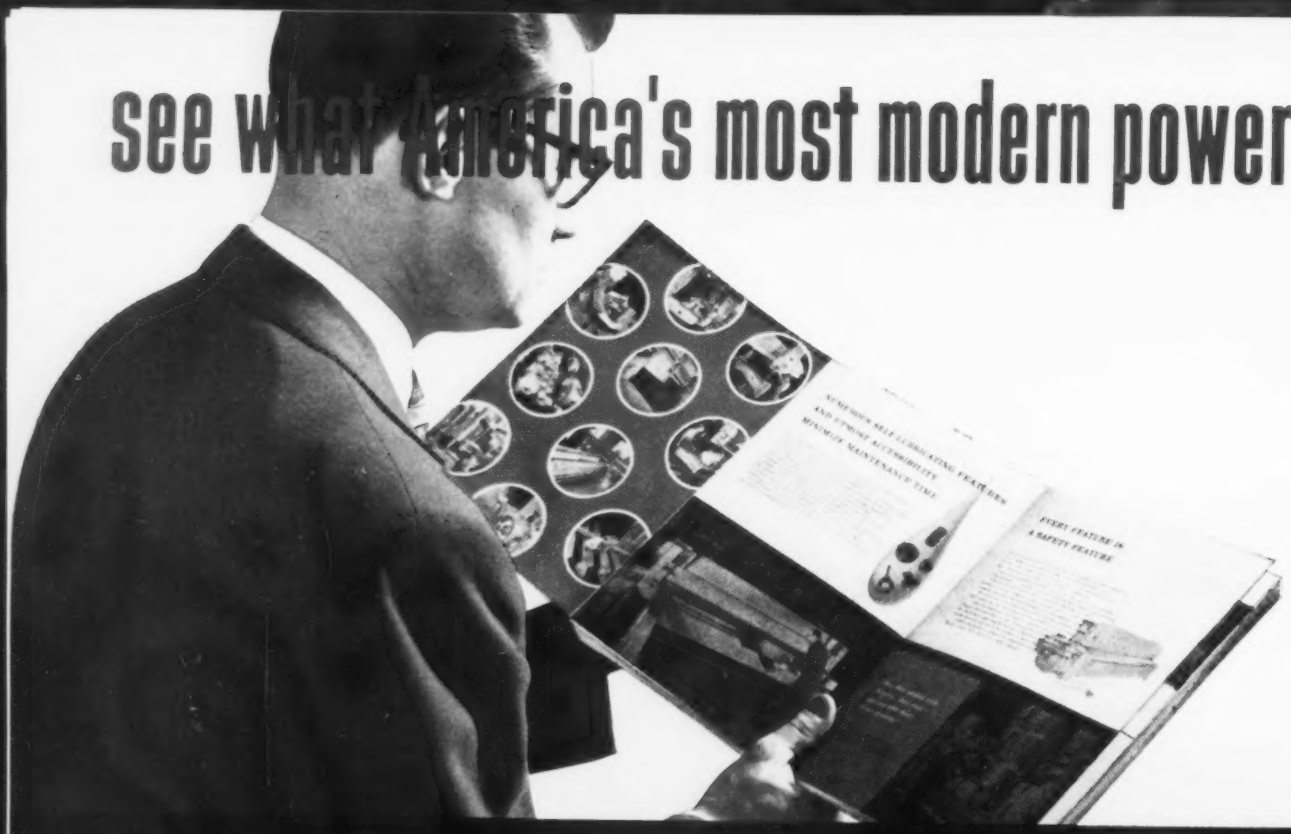

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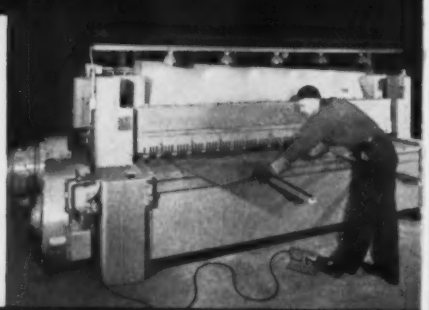

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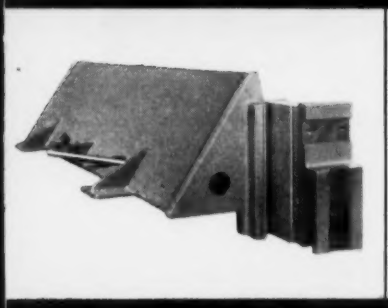
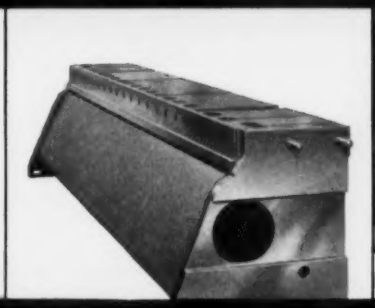


Fully Closed Box Type Construction



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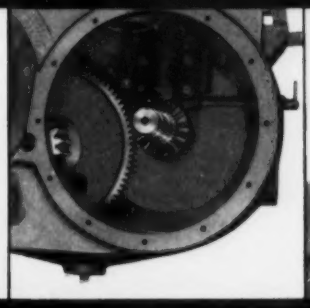

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Powerful, Self-Compensating Holddown

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IA

## TRACK WHEEL BEARINGS ARE COMPLETELY PROTECTED

Whether it's tropical muck or crystal sharp Alcan dust, nothing sneaks past the C/R End Face Seals guarding the track wheels of this giant Oliver OC-18 Crawler. And here's why: The mating rings in this steel-on-steel C/R Seal are lapped flat within .000034 inch! They form a leakproof seal so dependable that even under the worst field conditions the oil and the bearings stay clean and the oil level does not require the usual frequent checking. Seal performance like this cuts downtime for lube checks . . . saves big money on round-the-clock operations. This is only one of the hundreds of successful applications for C/R End Face Seals. Equally difficult sealing problems are being solved—and big money saved—with high-speed and high pressure C/R End Face Seals in pumps, tools and aircraft accessory drives, and with medium speed C/R End Face Seals in washing machines and similar home appliances.

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# How To Get More For Your Metalworking Dollar

Number 7 of a series

# ALUMINUM

**IN THIS FEATURE**

Popular acceptance of aluminum as an engineering material continues to increase. This trend has not abated in more than two decades, nor is it likely to slow down in the forseeable future.

There are obvious reasons for this growth in popular acceptance. Aluminum is priced competitively, combines strength and light weight, doesn't rust. It is pretty much a cinch to machine.

But there are also more subtle reasons—highly profitable ones — for choosing aluminum. You may have overlooked some of them; or simply never bothered to survey them systematically.

This article sets out to do just that. It points out the many ways in which aluminum can contribute to product quality, cut manufacturing cost, or help simplify your manufacturing processes.

HOW TO GET MORE FOR YOUR ALUMINUM DOLLAR

SECTION 1

**Properties**
**Designations**
**Alloy Selection**
**Heat Treatment**
**Forgings**
**Castings**
**Melting Practice**

# Selection: Your Margin To Profit

**Aluminum consumption is at the highest peak ever. So is the industry's expansion.**

**What properties does this metal have that'll boost demand for it by about another 10 pct this year?**

**This report gets into the metal itself to tell designers, engineers, fabricators and others why aluminum holds a dominant place among nonferrous metals.**

• ALUMINUM is often called a "modern" metal. Aside from the advertising fraternity's fondness for the terms "modern" and "up-to-date," this designation—as it applies to aluminum—makes sense in at least two respects.

Historically, the availability of high-strength aluminum alloys in mass production quantities is an accomplishment of the present century. So, too, are the meteoric growth of production facilities and the introduction of what one expert terms "free enterprise" to the aluminum industry.

But the most significant reason for the claim to modernity is to be found in the engineering properties of aluminum and its alloys. In an era that demands that its materials be both lightweight and strong, aluminum has the advantage of being able to fulfill both requirements.

Being "modern" can be ranked as a kind of virtue. Still, there are some who consider it a relative virtue. Quite a few engineers are not entirely sold on the "modern" approach. They retain a natural bias for cumbersome construction on the grounds that it is built "to last forever."

This viewpoint is best summarized in the comment of a conservative old lady regarding the weather. "There is no doubt about it," she said, "even the modern thunderstorms no longer clear the air."

The broader view is more encompassing and far more realistic. It acknowledges that aluminum has its limitations—that it cannot be logically substituted for many of the high temperature steels, for example. But it also recognizes the unique advantages aluminum has to offer. And weighing both limitations and advantages, it sets out determined to get the most for every pound of aluminum purchased.

### Which *alloy*?

To do this requires a combination of wise decisions. First, it implies that you must decide upon the aluminum alloy best suited to your particular application. A second decision is somewhat simpler—namely, the form in which the alloy should be ordered. Finally, you must consider all of the essentials of efficient fabrication that go into making a profitable end product.

Reynolds Metals Co.

**GIANT coils of aluminum strip are carefully checked by inspector before leaving strip mill.**

Since aluminum lends itself to virtually every type of fabrication, you must pre-plan suitable methods (wherever required) for heat treating, machining, forming, joining, and surface finishing. All of these decisions will contribute to the ultimate success of your final product in terms of both cost and acceptable performance.

Conversely, cost and product performance should be your prime determinants in selecting an aluminum alloy. In your cost considerations, however, you need not be solely concerned with the cost variables which may apply when you choose one alloy instead of another. Such differences are frequently small and sometimes negligible.

Aluminum Co. of America

**HERE'S one forging job that requires almost the full die area. The forging press has a 15,000-ton capacity. Large forgings such as this often provide extra savings in machining and assembling.**

Straight thinking on costs must always take into consideration proposed fabricating methods and availability of materials. These are, by far, the more significant cost factors.

Some may question the wisdom of emphasizing availability. It seems plain enough that there is plenty of aluminum available. More than 3 billion pounds of it were produced last year.

Perhaps the best answer to the availability question is that there **is** plenty of aluminum available—**as such.** But the aluminum you order is bound to take a special form. Perhaps it will be barstock, or ingot, or wire, or sheet of a special thickness. Or perhaps you may decide upon an alloy that is normally produced in restricted quantities.

All of these factors can affect availability. Depending upon the size of your order, you may want to buy directly from warehouse stock. If this is your intention, it is good practice to check with the warehouse first.

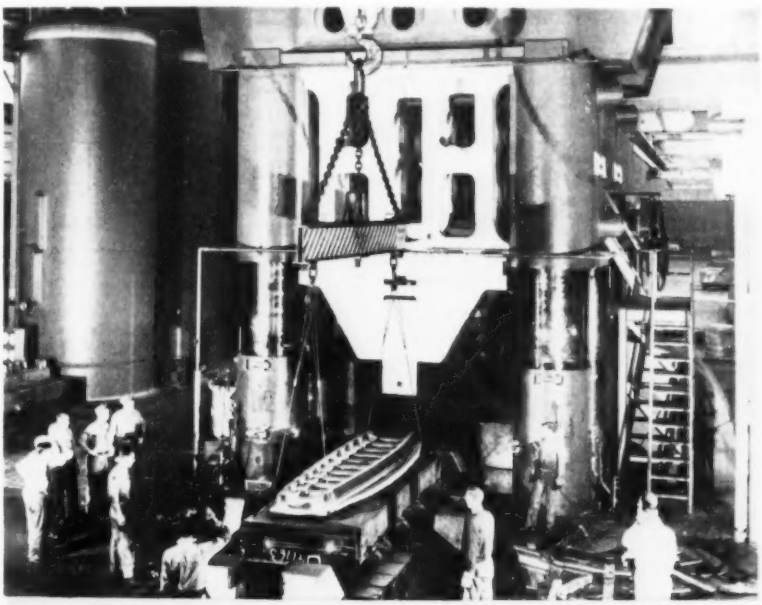
### How about quantity?

Make sure that the product you have in mind is available and in the quantities you need. Otherwise, it may be necessary to place a special mill order. Mill orders—when they can be accepted—are likely to involve delay and may result in additional expense.

If you ask a physical metallurgist, he may tell you that there are tens of thousands of possibly useful aluminum alloys. Fortunately, this fact is of no particular consequence to the average buyer of aluminum. He need only concern himself with choosing from a list of less than 25 wrought materials —or, in the case of castings, a list of 30 alloys—designed to suit his purpose.

Both wrought and cast alloys, together with their proper designations, are listed on p. 60-61. The listings cover widely used alloys most likely to be available. They represent the bulk of aluminum production today. With your own application in mind, a quick glance at the applications columns will help you narrow your choice of alloy—whether wrought or cast —to a very few possibilities.

In the case of the wrought materials, both the old and new designations are listed for all alloys. The new designations became effective in October, 1954. Not everyone is familiar with them, but they are the standard designations now used by the aluminum industry.



Aluminum Co. of America

**KING-SIZE, this 3,000-lb aluminum section is removed from a 50,000-ton press. This claims to be the world's largest closed die forging. Assembly is used in the multi-jet Martin XP6M SeaMaster.**

## Table I — Wrought Alloy Selector

| ALLOY New Design | ALLOY Old Design | Usual Commercial Tempers | oducts[1] Sheet and Plate | Rod | Bar | Rolled Shapes | Extruded Shapes | Extruded Tube | Drawn Tube | Pipe | Forgings | Approximate Relative Ratings Based on Various Characteristics[2] Strength[3] | Workability Cold | Resistance to Corrosion | Weldability Arc | Machinability | Electrical Conductivity | Forgeability | Hardness | Typical Uses |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EC | EC | O, H12, H13, H17 | | × | × | [4] | | | | | | D | A | A | A | B | A | | D | Electrical conductors. |
| 1100 | 2S | O, F, H112, H12, H14, H16, H18 | × | × | × | | | | | | | D | A,B | A | A | B | B | A | D,C | Sheet metal work, spun hollow ware and decorative parts. |
| 3003 | 3S | O, F, H112, H12, H14, H16, H18 | × | | | | | × | × | × | | D | A,C | A | A | B | C | A | D,C | Cooking utensils, chemical equipment, pressure vessels, storage tanks, piping, architectural applications and builders' hardware. |
| 3004 | 4S | O, F, H112, H32, H34, H36, H38 | × | | | | | | | | | C | A,C | A | A | B | C | | C | Special sheet metal work, shoe eyelets, screw shells, pressure vessels and storage tanks. |
| 2011 | 11S | T3, T8 | | × | [5] | | | | | | | B | C,D | C[6] | D | A | C | | B | Screw machine products. |
| 2014 | 14S | T4, T6 | | × | × | × | × | × | | | × | A | C,D | C[6] | B | A | C | C | B,A | Heavy-duty structures, aircraft structures and truck frames. |
| 2017 | 17S | T4 | | × | × | | | | | | | A | C | C[6] | D | A | D | | B | Screw machine products. |
| 2018 | 18S | T61 | | | | | | | | | × | A | | C | B | A | C | C | B | Aircraft engine cylinder heads and pistons. |
| 2218 | B18S | T72 | | | | | | | | | × | B | | C | B | A | C | D | B | Aircraft engine cylinder heads and pistons, jet engine impellers and compressor rings. |
| 2024 | 24S | T3, T36, T4 | × | × | × | | × | × | × | | | A | C,D | C[6] | C | A | D | | A | Aircraft structures, truck wheels and screw machine products. |
| 4032 | 32S | T6 | | | | | | | | | × | B | | C | B | C | D | C | B | Pistons. |
| 5050 | 50S | O, F, H112, H32, H34, H36, H38 | × | | | | | | [7] | | | C | A,C | A | A | B | B | | D,C | Decorative refrigerator parts, builders' hardware and coiled tubes. |
| 6151 | A51S | T6 | | | | | | | | | × | B | | B | A | B | C | A | B | Intricate forgings for machine and automotive parts. |
| 5052 | 52S | O, F, H112, H32, H34, H36, H38 | × | × | × | | | | × | | | C | A,C | A | A | B | D | | C,B | Sheet metal work, home appliances, bus, truck and marine applications, hydraulic tubes, street light standards, clock plates and parts. |
| 6061 | 61S | T4, T6, T62 | × | × | × | × | × | × | × | × | × | C,B | B | A | A | B | C | | C,B | Heavy-duty structures where resistance to corrosion is necessary, bridge railings, marine applications, furniture, truck bodies, truck frames, trailers, railroad cars, tread plate, pipe and pipe flanges. |
| 6062 | 62S | T4, T6, T62 | | | | | × | × | × | | | C,B | B | A | A | B | C | | C,B | Alternate for 6051 alloy. |
| 6063 | 63S | T42, T5, T6, T83, T831, T832 | | | | | × | × | × | × | | C,B | B,C | A | A | B | B | | C,B | Pipe, railings, builders' hardware, windows, store fronts and architectural applications. |
| 7075 | 75S | T6 | × | × | × | | × | × | | | × | A | D | C | C | A | D | D | A | Aircraft structures and keys. |

[1] Not all products are available in all tempers. [2] A, B, C and D are arbitrary relative ratings in decreasing order of merit. Where two letters are shown, that on the left is for the softest temper listed and that on the right for the hardest temper listed. [3] See Table 3 for minimum strength values. [4] Channel bus only. [5] Hexagon only. [6] In thicknesses of about $\frac{1}{8}$ in. and over, these alloys in the -T3, -T4 and -T36 tempers have a "D" rating. [7] Annealed temper only.

**ALUMINUM DOLLAR** | *Continued*

You will note that, in common with SAE steel designations, the new system for wrought alloys makes use of four digits. The first digit of the designation, according to the Aluminum Association, indicates a particular alloy group.

Thus 1XXX indicates a minimum of 99 pct aluminum—or just plain aluminum. The 2XXX series indicates an aluminum alloy in which copper is the major alloying element. Other major alloying elements are indicated by 3XXX—for manganese, 4XXX—for silicon, 5XXX—for magnesium, 6XXX—for a combination of silicon and magnesium, and 7XXX—for zinc. A predominance of still other elements would be listed as 8XXX.

The second digit in the designation indicates modifications in impurity limits. If this digit is zero, for example, it means that there is no special control on individual impurities. The numbers 1 and 9 are used consecutively to indicate special control of one or more individual impurities.

### New designations

Thus 1030 indicates 99.30 pct minimum aluminum content with no special control on individual impurities. Such designations as 1130, 1230, or 1330 indicate the same basic purity with special control on one or more impurities.

In the 2XXX through 8XXX groups, the last two of the four digits serve as a link to the old numbering system. Thus 2014 was formerly 14S, 3003 was 3S, and 7075 was 75S.

To make use of the "alloy selector" chart on p. 60, first narrow your selection in terms of specific application. You will note that typical applications are listed in the column at the far right. After you have decided upon one or more possible alloys, carefully check the characteristics of each material to determine which alloy best suits your application. These characteristics are shown in the "relative ratings" columns.

## Table II — Cast Alloy Selector

| Alloy | Usual Commercial Tempers | Types of Castings: Sand | Permanent Mold | Die | Approximate Relative Ratings Based on Various Characteristics[1]: Strength[2] | Castability | Resistance to Corrosion | Weldability (Torch and Arc) | Machinability | Electrical Conductivity | Pressure Tightness | Hardness | Typical Uses |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43 | F | × | × | | D | A | B | A | D | C | A | D | General-purpose casting alloy, cooking utensils, architectural and marine applications and pipe fittings. |
| 108 | F | × | | | C | B | D | B | B | C | B | C | General-purpose sand castings, manifold and valve bodies. |
| A108 | F | | × | | C | B | D | B | B | C | B | C | General-purpose permanent-mold castings and ornamental grills. |
| 113 | F | × | × | | C | B | D | C | B | C | B | C | Housings, covers, hand wheels and washing machine agitators. |
| C113 | F | | × | | B | B | D | B | B | D | B | B | Washing machine agitators, automotive cylinder heads and timing gears. |
| 122 | T551, T61, T65 | × | × | | B,A | C | D | D | A | C | C | A | Bushings, bearing caps and meter parts. |
| A132 | T551, T65 | | × | | B | C | C | C | C | D | B | B,A | Heavy-duty diesel pistons. |
| D132 | T5 | | × | | B | B | C | C | C | D | B | B | Automotive pistons. |
| 138 | F | | × | | B | C | D | C | B | D | C | B | Sole plates for electric hand irons. |
| 142 | T21, T571, T61, T77 | × | × | | C,A | C | C | D | B | B,C | C | C,B | Heavy-duty pistons and air-cooled cylinder heads. |
| 195 | T4, T6, T62 | × | | | B | C | C | C | B | C | C | C,B | Machinery and aircraft structural members. |
| B195 | T4, T6, T7 | | × | | B | C | C | C | B | C | C | C,B | Aircraft fittings, gear housings and gun control parts. |
| 214 | F | × | | | C | C | A | B | A | C | D | C | Food handling and chemical equipment, marine hardware and architectural applications. |
| A214 | F | | × | | C | C | A | B | A | C | D | C | Cooking utensils. |
| B214 | F | × | | | C | C | A | B | B | C | C | C | Cooking utensils and pipe fittings. |
| F214 | F | × | | | C | C | A | B | A | C | D | C | Alumilite coated architectural parts and ornamental hardware. |
| 218 | F | | | × | A | D | A | | A | D | D | | Die castings requiring high strength, ductility and resistance to corrision, such as marine fittings and hardware. |
| 220 | T4 | × | | | A | D | A | D | A | D | D | C | Sand castings requiring strength and shock resistance, such as aircraft structural members. |
| 319 | F, T6 | × | | | C,B | B | C | B | B | D | B | C,B | General-purpose sand castings, engine parts, automotive cylinder heads and piano plates. |
| 333 | F, T5, T6, T7 | | × | | B,A | B | C | B | B | D,C | B | B | General-purpose permanent-mold castings, engine parts, gas meter housings and regulator parts. |
| 355 | T51, T6, T61, T62, T7, T71 | × | × | | C,B | A | B | B | B | C,B | A | C,B | Crankcases, accessory housings and aircraft fittings. |
| 356 | T51, T6, T7, T71 | × | × | | C,B | A | B | B | B | C,B | A | C,B | Transmission cases, truck-axle housings and wheels, cylinder blocks, railway tank car fittings, marine hardware, valve bodies and bridge railing parts. |
| 360 | F | | | × | A | A | B | | C | D | A | | General-purpose die castings, cover plates and instrument cases. |
| 380 | F | | | × | A | B | C | | C | D | B | | General-purpose die castings. |
| A612 | F | × | | | B | C | B | C | A | C | D | C | General-purpose sand castings for brazing. |
| C612 | F | | × | | B | D | B | C | A | B | D | C | Torque converter blades and brazed parts. |

[1] Not all products are available in all tempers. [2] A, B, C and D are arbitrary relative ratings in decreasing order of merit. Where two letters are shown that on the left is for the softest temper listed and that on the right for the hardest temper listed.

To illustrate how these "relative ratings" can be of help, let's assume that you have narrowed your choice to two alloys—2014 and 2024. You now have to make a final choice. Both alloys are similarly high in strength. Principal differences are to be found in weldability and the types of products available.

If you intend to weld, 2014 alloy is likely to be the better bet. This material, however, is not available in sheet form. If this availability factor is significant, you may be obliged to choose 2024 primarily because it is available in sheet form. If, on the other hand, your application calls for barstock, both alloys are available in this form. Therefore, your ultimate choice would again be based primarily on "relative ratings."

After you reach a tentative decision on the basis of the alloy selector, make a final check of the chosen alloy's mechanical properties. These are to be found on p. 62. If these properties meet the engineering requirements of your final product, your choice of alloy qualifies in terms of both technical and manufacturing efficiency.

### Heat treating

Heat treating often plays an important role in processing. Some aluminum alloys are not heat-treatable, although they may require "in process" annealing for special applications. Metallurgically, these materials are made up of elements which remain in solid solution or form insoluble constituents. In this group are high purity aluminum and such alloys as 1100, 3003, 3004, 5052, and 5056.

On the other hand, many aluminum alloys do respond to heat treatment. It is a relatively simple and direct method for improving their strength. Grouped in this classification are the high copper-bearing alloys, the magnesium silicide alloys, and the high zinc-bearing alloys. The various temper designations applicable to heat treated materials are shown on p. 65.

Not all heat treatments apply

equally to both wrought and cast aluminum alloys. There is a general heat treatment, however, intended to improve strength and increase hardness. It begins with a solution treatment and drastic quench; finishes with a precipitation or age-hardening treatment.

Technically, solution treating serves to place into solution those alloying elements which are soluable at elevated temperatures. Rapid quenching is designed to prevent or retard re-precipitation of these elements. Solution treatment also provides a completely homogeneous structure.

Frequently, the solution treating temperature of a particular alloy is very close to the melting point of some of the alloy constituents present. This means overheating must be diligently avoided. Accurate temperature control coupled with highly uniform heating is absolutely essential. Anything less may result in incipient melting.

Solution treating temperatures range from about 825° to 980° F,

## Table III Mechanical Properties Of Wrought Aluminum Alloys

| | TENSION | | | | HARDNESS | | | SHEAR | FATIGUE | MODULUS |
|---|---|---|---|---|---|---|---|---|---|---|
| | STRENGTH psi | | ELONGATION in 2 Inches—Percent | | BRINELL NUMBER 500-Kg Load 10-mm Ball | ROCKWELL VALUES | | | | |
| ALLOY AND TEMPER | Ultimate | Yield | 1/16 Inch Thick Specimen | 1/2 Inch Diameter Specimen | | E Scale | 15T Scale | Shearing Strength psi | Endurance Limit psi | Modulus of Elasticity psi |
| EC-H19 | 27,000 | 24,000 | | | | | | | 7,000 | $10.0 \times 10^6$ |
| 1100-O | 13,000 | 5,000 | 35 | 45 | 23 | | 20 | 9,500 | 5,000 | |
| 2S-H12 | 15,500 | 14,000 | 12 | 25 | 28 | 25 | 47 | 10,000 | 6,000 | |
| 2S-H14 | 18,000 | 16,000 | 9 | 20 | 32 | 35 | 55 | 11,000 | 7,000 | $10.0 \times 10^6$ |
| 2S-H16 | 21,000 | 19,000 | 6 | 17 | 38 | 48 | 61 | 12,000 | 8,500 | |
| 2S-H18 | 24,000 | 22,000 | 5 | 15 | 44 | 60 | 66 | 13,000 | 8,500 | |
| 3003-O | 16,000 | 6,000 | 30 | 40 | 28 | | 37 | 11,000 | 7,000 | |
| 3S-H12 | 19,000 | 17,000 | 10 | 20 | 35 | 44 | 56 | 12,000 | 8,000 | |
| 3S-H14 | 22,000 | 20,000 | 8 | 16 | 40 | 50 | 60 | 14,000 | 9,000 | $10.0 \times 10^6$ |
| 3S-H16 | 26,000 | 24,000 | 5 | 14 | 47 | 58 | 66 | 15,000 | 9,500 | |
| 3S-H18 | 29,000 | 27,000 | 4 | 10 | 55 | 67 | 69 | 16,000 | 10,000 | |
| 3004-O | 26,000 | 10,000 | 20 | 25 | 45 | | 57 | 16,000 | 14,000 | |
| 4S-H32 | 31,000 | 22,000 | 10 | 17 | 52 | | | 17,000 | 14,500 | |
| 4S-H34 | 34,000 | 27,000 | 9 | 12 | 63 | 76 | 75 | 18,000 | 15,000 | $10.0 \times 10^6$ |
| 4S-H36 | 37,000 | 31,000 | 5 | 9 | 70 | | | 20,000 | 15,500 | |
| 4S-H38 | 40,000 | 34,000 | 5 | 6 | 77 | 81 | 79 | 21,000 | 16,000 | |
| 2011-T3 | 55,000 | 48,000 | | 15 | 95 | 95 | 82 | 32,000 | 18,000 | $10.2 \times 10^6$ |
| 11S-T8 | 69,000 | 45,000 | | 12 | 100 | 98 | 84 | 35,000 | 18,000 | |
| 2014-O | 27,000 | 14,000 | | 18 | 45 | | | 18,000 | 13,000 | |
| 14S-T4 | 62,000 | 40,000 | | 20 | 105 | | | 38,000 | 20,000 | $10.6 \times 10^6$ |
| 14S-T6 | 70,000 | 60,000 | | 13 | 135 | | 89 | 42,000 | 18,000 | |
| 2017-O | 26,000 | 10,000 | | 22 | 45 | | | 18,000 | 13,000 | $10.5 \times 10^6$ |
| 17S-T4 | 62,000 | 40,000 | | 22 | 105 | 95 | 82 | 38,000 | 18,000 | |
| 2018-T61 | 61,000 | 46,000 | | 12 | 120 | | | 39,000 | 17,000 | $10.8 \times 10^6$ |
| 2218-B18S-T72 | 48,000 | 37,000 | | 11 | 95 | | | 30,000 | | $10.8 \times 10^6$ |
| 2024-O | 27,000 | 11,000 | 19 | 22 | 47 | 51 | 59 | 18,000 | 13,000 | |
| 24S-T3 | 70,000 | 50,000 | 16 | | 120 | ** | 85 | 41,000 | 20,000 | $10.6 \times 10^6$ |
| 24S-T4 | 68,000 | 48,000 | 20 | 19 | 120 | 98 | 84 | 41,000 | 20,000 | |
| 24S-T36 | 73,000 | 57,000 | 13 | | 130 | ** | 88 | 42,000 | 18,000 | |
| 4032-T6 | 55,000 | 46,000 | | 9 | 120 | | | 38,000 | 16,000 | $11.4 \times 10^6$ |
| 5050-O | 20,000 | 8,000 | 28 | | 35 | 24 | 50 | | | |
| 50S-H32 | 24,500 | 20,500 | 10 | | 45 | 49 | 62 | | | |
| 50S-H34 | 27,500 | 24,000 | 9 | | 50 | 61 | 68 | | | $10.0 \times 10^6$ |
| 50S-H36 | 29,000 | 26,000 | 8 | | 55 | 68 | 71 | | | |
| 50S-H38 | 31,500 | 29,000 | 7 | | 68 | 74 | 73 | | | |
| 6151-T6 | 48,000 | 43,000 | | 17 | 100 | | | 32,000 | 11,000 | $10.2 \times 10^6$ |
| 5052-O | 28,000 | 13,000 | 25 | 30 | 45 | 53 | 65 | 18,000 | 17,000 | |
| 52S-H32 | 34,000 | 27,000 | 12 | 18 | 62 | 74 | 75 | 20,000 | 17,500 | |
| 52S-H34 | 37,000 | 31,000 | 10 | 14 | 67 | 79 | 77 | 21,000 | 18,000 | $10.2 \times 10^6$ |
| 52S-H36 | 39,000 | 34,000 | 8 | 10 | 74 | 81 | 79 | 23,000 | 18,500 | |
| 52S-H38 | 41,000 | 36,000 | 7 | 8 | 85 | 85 | 81 | 24,000 | 19,000 | |
| 6061-O | 18,000 | 8,000 | 22 | 30 | 30 | 21 | 44 | 12,500 | 9,000 | |
| 61S-T4 | 35,000 | 21,000 | 22 | 25 | 65 | 72 | 71 | 24,000 | 13,500 | $10.0 \times 10^6$ |
| 61S-T6 | 45,000 | 40,000 | 12 | 17 | 95 | 92 | 81 | 30,000 | 13,500 | |
| 6062-O | 17,000 | 6,500 | | 30 | 28 | | | 12,000 | 8,500 | |
| 62S-T4 | 35,000 | 21,000 | | 25 | 65 | | | 24,000 | 13,500 | $10.0 \times 10^6$ |
| 62S-T6 | 45,000 | 40,000 | | 17 | 95 | | | 30,000 | 13,500 | |
| 6063-T42 | 22,000 | 13,000 | 20 | | 42 | | | 14,000 | | |
| 63S-T5 | 30,000 | 25,000 | 12 | | 65 | | | 18,000 | | |
| 63S-T6 | 35,000 | 30,000 | 12 | | 73 | | | 22,000 | | $10.0 \times 10^6$ |
| 63S-T83 | 38,000 | 36,000 | 10 | | 82 | | | | | |
| 63S-T831 | 32,000 | 29,000 | 10 | | 70 | | | | | |
| 63S-T832 | 45,000 | 40,000 | 10 | | 95 | | | | | |
| 7075-O | 33,000 | 15,000 | 17 | 16 | 60 | | | 22,000 | | $10.4 \times 10^6$ |
| 75S-T6 | 82,000 | 72,000 | 11 | 11 | 150 | | | 49,000 | 24,000 | |

depending upon the alloy being treated. But regardless of the specific temperature used, temperature uniformity should be maintained within the limits of ± 10°F.

When temperatures are too high, there is an appreciable increase in quenching strain in addition to the more obvious hazard of partial melting. When temperatures are too low, solution is incomplete and maximum strength and hardness values are not obtained from the treatments.

In your solution treating practice, two other factors are also important. One is the time the work is held at temperature—or soaking time. This may vary from 10 minutes for thin sheet to as much as 12 hours for massive forgings. In either case, the time period must be adequate to provide complete solution.

### Solution treating

Correct quenching is another important factor to remember. Follow recommended practice in connection with quench bath temperature. Normally, a cold water bath should not exceed about 85°F. Hot water quenching, aimed at minimizing distortion and cracking, usually calls for a water temperature in the range of 150° to 212°F.

The solution-treated alloy is relatively soft. It is hardened by aging. Some alloys are actually over-aged in order to improve their resistance to corrosion. In general, all heat-treatable alloys are aged at either room temperatures or at slightly elevated temperatures ranging from 250° to 375°F.

Alloys which age at room temperatures are known as "natural aging." Time required for this type of aging may be 4 or 5 days, although 90 pct of the aging process is completed during the first 24 hours. At the end of the process, these alloys have obtained their full strength.

Artificially aged alloys require aging at slightly elevated temperatures to complete the strengthening process. Although the temperature range is rather low (250° - 375°F), temperature uniformity is still very critical. Optimum control calls for a range that does not exceed ± 5°F. Depending upon the particular alloy and the degree of aging required, these aging cycles will run from 6 to 24 hours.

Reynolds Metals Co.

**ELECTROLYTIC reduction cells or "pots" break down alumina (aluminum oxide) into metallic aluminum and oxygen. Normally, it takes about 10 kw-hours of electricity to produce a pound of aluminum.**

Even when preliminary solution treating is correct in every detail, improper artificial aging can cause serious trouble. Low tensile and yield strengths frequently result from either underaging or overaging.

### Aging affects properties

Embrittlement, accompanied by a serious reduction in elongation, is often caused by an excessively high aging temperature or an over-extended aging period. Conversely, too low a temperature or too short an aging period will produce high ductility with very low yield strengths. In addition to affecting mechanical properties, improper aging can appreciably lesson resistance to corrosion.

Not all design problems can be readily solved by the use of standard aluminum mill products. Frequently, the most direct answer to efficient design is to be found in either forgings or castings. Here, again, aluminum displays above-average versatility. It can be either forged or cast with relative ease.

The aircraft industry was among the first to recognize, and make capital of, the engineering advantages of aluminum forgings. But the combinations of high strength and low weight, good machining qualities and high dimensional stability, uniformity and reliability were bound to attract the attention of other major industries.

The hot-working of the aluminum billet during forging provides the finished product with extra toughness, a refined grain structure, and useful directional properties. These factors contribute significantly to performance in both impact and vibratory loading of the forgings.

## Table IV Mechanical Properties Of Aluminum Sand Castings

| ALLOY AND TEMPER | TENSION | | | COMPRESSION | HARDNESS | SHEAR | FATIGUE |
|---|---|---|---|---|---|---|---|
| | Ultimate Strength psi | Yield Strength (Set 0.2%) psi | Elongation Percent in 2 Inches | Yield Strength (Set 0.2%) psi | BRINELL 500-Kg Load 10-mm Ball | Shearing Strength psi | Endurance Limit psi |
| 43 | 19,000 | 8,000 | 8.0 | 9,000 | 40 | 14,000 | 8,000 |
| 108 | 21,000 | 14,000 | 2.5 | 15,000 | 55 | 17,000 | 11,000 |
| 112 | 24,000 | 15,000 | 1.5 | 16,000 | 70 | 20,000 | 9,000 |
| 113 | 24,000 | 15,000 | 1.5 | 16,000 | 70 | 20,000 | 9,000 |
| 122-T2 | 27,000 | 20,000 | 1.0 | 20,000 | 80 | 21,000 | 9,500 |
| 122-T61 | 41,000 | 40,000 | | 43,000 | 115 | 32,000 | 8,500 |
| 142-T21 | 27,000 | 18,000 | 1.0 | 18,000 | 70 | 21,000 | 6,500 |
| 142-T571 | 32,000 | 30,000 | 0.5 | 34,000 | 85 | 26,000 | 8,000 |
| 142-T77 | 30,000 | 23,000 | 2.0 | 24,000 | 75 | 24,000 | 10,500 |
| 195-T4 | 32,000 | 16,000 | 8.5 | 17,000 | 60 | 26,000 | 7,000 |
| 195-T6 | 36,000 | 24,000 | 5.0 | 25,000 | 75 | 30,000 | 7,500 |
| 195-T-62 | 40,000 | 34,000 | 1.5 | 36,000 | 95 | 32,000 | 8,000 |
| 212 | 23,000 | 14,000 | 2.0 | 14,000 | 65 | 20,000 | 9,000 |
| 214 | 25,000 | 12,000 | 9.0 | 12,000 | 50 | 20,000 | 7,000 |
| B214 | 20,000 | 13,000 | 2.0 | 14,000 | 50 | 17,000 | |
| F214 | 21,000 | 12,000 | 3.0 | 13,000 | 50 | 17,000 | |
| 220-T4 | 46,000 | 25,000 | 14.0 | 26,000 | 75 | 33,000 | 8,000 |
| 319 | 27,000 | 18,000 | 2.0 | 19,000 | 70 | 22,000 | 10,000 |
| 319-T6 | 36,000 | 24,000 | 2.0 | 25,000 | 80 | 29,000 | 10,000 |
| 355-T51 | 28,000 | 23,000 | 1.5 | 24,000 | 65 | 22,000 | 7,000 |
| 355-T6 | 35,000 | 25,000 | 3.0 | 26,000 | 80 | 28,000 | 9,000 |
| 355-T61 | 39,000 | 35,000 | 1.0 | 37,000 | 90 | 31,000 | 8,500 |
| 355-T7 | 38,000 | 36,000 | 0.5 | 38,000 | 85 | 28,000 | 9,000 |
| 355-T71 | 35,000 | 29,000 | 1.5 | 30,000 | 75 | 23,000 | 10,000 |
| 356-T51 | 25,000 | 20,000 | 2.0 | 21,000 | 60 | 20,000 | 7,500 |
| 356-T6 | 33,000 | 24,000 | 3.5 | 25,000 | 70 | 26,000 | 8,500 |
| 356-T7 | 34,000 | 30,000 | 2.0 | 31,000 | 75 | 24,000 | 9,000 |
| 356-T71 | 28,000 | 21,000 | 3.5 | 22,000 | 60 | 20,000 | |

**ALUMINUM DOLLAR** | *Continued*

Aluminum does not scale during forging. This means that the "as forged" surface is smooth and clean. Absence of scale also contributes to ease of machining and eliminates surface stress-raisers. Finishing costs are proportionately less because the smooth, forged surfaces require less cleaning and polishing.

Careful comparative cost studies will quickly point to ways in which aluminum forgings can be used effectively and economically. Begin with part design. Take special note of those parts that call for strength, elaborate forming, and minimum weight. Many such parts are likely to lend themselves to the forging process—and at less cost.

Aluminum may be either hand forged or die forged. In general, both types of forgings can be handled on standard equipment. Forging aluminum, however, does differ from forging certain other metals in at least one important respect. It requires high die forces. At the relatively low forging temperatures normally used, aluminum does not have a great deal of plasticity—less, in fact, than steel.

The key to lower forging costs is to be found in simple, efficient design. The designer must have a working knowledge of both die construction and the flow characteristics of the metal to be forged in order to keep costs down. This is another way of saying that he must know the "ground rules" of forging—especially as they apply to aluminum.

### Tips on forging

Most of these fundamentals have been spelled out in guide books prepared by the aluminum producers and aimed particularly at the needs of the design engineer. Specifying the correct draft angle limits for hammer and press forgings is one such fundamental.

Usually, a 5 or 7 degree draft angle is called for. However, when split dies are used on mechanical upsetters, drafts as low as ¼ degree are permissible.

Knowing how to properly locate parting lines is another fundamental. This is the line along which the dies separate. It is a preliminary step in forging design that directly affects die costs, drafts, grain flow, and subsequent trimming. That is why it figures importantly in forging costs.

Most parting lines are located at the largest cross-section of the forging. This is acceptable practice, but it need not be arbitrarily applied.

There are times when a parting line can be made to coincide with a flat side of a forging. This means that the top die can be simplified to a perfectly flat surface. Flat-sided forgings tend to cut die costs and simplify trimming.

The tendency towards "side thrust" is a forging problem that can usually be avoided in the design stages. By "side thrust" is meant a lopsided displacement of metal that sets up off-center stresses on both die and press.

This can usually be overcome by tilting the forging in the die in such a way as to make the forging plane and parting line ap-

proximately parallel. It is an important cost reduction item because it reduces press and die wear and eliminates ledges and counterlocks.

Designing for thin webs and ribs requires extra care. These sections, because they are thin, lose heat rapidly in the forging dies. This tendency introduces the possibility of cold striking. Also, it means uneven shrinking with the thinner web sections shrinking faster than the rest of the forging. Uneven shrinking can result in undesirable dimensional relationships and excessive warping.

For the design engineer, castings provide a versatile means for capitalizing on the desirability of using aluminum. Actually, it is the alloys of aluminum which are most apt to hold his attention. Pure aluminum is seldom used in production castings.

The strength of pure aluminum in the cast form is inferior; its casting qualities are poor. Unless he is interested in optimum electrical conductivity, the design engineer is well advised to avoid the pure aluminum casting.

But that special qualification hardly narrows his range. There are many useful aluminum alloys. The majority of them have excellent castability. In fact, the improvement in aluminum alloy casting quality is a principal inducement for seriously considering aluminum castings. High strength and other desirable properties make the use of castings even more attractive.

### Alloying enhances properties

The metallurgy of aluminum alloy castings reflects the complexity that has resulted from the many efforts aimed at material improvement. Many elements are now added to aluminum castings to make their properties superior —copper, silicon, magnesium, manganese, zinc, nickel, chromium, tin —even titanium and the rare earth metals.

The design of a casting must incorporate not only functional requirements and attractive appearance, but also those factors imposed by casting processes. Alloys of aluminum can be cast in sand, in permanent or semi-permanent molds, or they can be die cast. Choice of a casting process stems from an evaluation of costs and casting design.

### Some mold cost factors

Permanent-mold or die castings call for relatively expensive mold equipment. These processes are normally used only for large quantities of identical castings. Aside from the fact that they lend themselves to mass production techniques, they produce an improved surface finish and close dimensional tolerances. This can result in savings in machining and surface finishing.

For top economy in sand castings, green sand should be used for molds and cores wherever possible. Because it is not as strong as dry sand, adequate provision must be made for strengthening with wire and other supports. Design should eliminate projecting and overhanging sections which may be subject to excessive erosion or breakage.

Good melting practice is essential in the aluminum foundry. Such practice combines careful control of melt chemistry and the elimination of undesirable impurities. Molten aluminum has a strong affinity for both hydrogen and oxygen. The oxygen, fortunately, forms a protective slag or dross at the top of the melt. This serves to cut down on further contamination. Hydrogen can be

**Table V**

**Here's what aluminum temper designations mean:**

—F As fabricated (Wrought Products)

—O Annealed, recrystallized. (Wrought Products Only. See —T2 for Cast)

—H Strain hardened. (Wrought Products Only)
- —H1, plus one or more digits. Strain hardened only.
- —H2, plus one or more digits. Strain hardened and then partially annealed.
- —H3, plus one or more digits. Strain hardened and then stabilized.

—W Solution heat treated—an unstable temper—before any straightening, flattening, or other shape-correcting operations. (Wrought Products)

—T Treated to produce stable tempers other than —F, —O, or —H.
- —T2, Annealed. (Cast Products Only)
- —T3, Solution heat treated and then cold worked. (Wrought Products)
- —T4, Solution heat treated. (Wrought or Cast Products)
- —T5, Artificially aged only. (Wrought or Cast Products)
- —T6, Solution heat treated and then artificially aged. (Wrought or Cast Products)
- —T7, Solution heat treated and then stabilized. (Cast Products Only)
- —T8, Solution heat treated, cold worked, and then artificially aged. (Wrought Products Only)
- —T9, Solution heat treated, artificially aged, and then cold worked. (Wrought Products Only)
- —T10, Artificially aged and then cold worked. (Wrought Products Only)

Note: The "—T" designations above may have one or more digits added to denote certain variations of the basic heat treatments described.

Reynolds Metals Co.

**LARGE remelting furnaces are used to produce aluminum alloying ingot. By properly combining ingot of different chemical analyses, it is possible to produce the wide variety of aluminum alloys.**



picked up from the moisture contained in the atmosphere.

Hydrogen absorption is generally more severe when the temperature of the melt or the time at temperature is increased. Although the oxide envelope affords protection, some hydrogen pick-up can occur during pouring. To minimize this tendency, pour rapidly and in a rather heavy stream. Pour as close to the mold as possible.

It is also important not to agitate the melt in such a way as to force the dross down into the molten metal. Entrapped dross is a harmful form of inclusion and is frequently a cause for rejecting a casting.

### Control temperature closely

Careful temperature control of molten aluminum will produce a superior cast product. Such control cannot depend upon visual observation but requires pyrometric equipment. The thermoelectric type that incorporates a thermocouple, compensating leads, and a calibrated millivoltmeter is most commonly used.

Good fluxing practice is also desirable. This tends to minimize dissolved gas and dross in the pouring ladle. Gaseous fluxing agents include nitrogen, helium, and argon. Solid fluxes such as zinc chloride and aluminum chloride are also used.

Fluxing is done while the metal is in the molten state. There is no single fluxing temperature, since choice of temperature depends upon the particular flux used. Normally, the heat is allowed to settle for not less than 10 minutes after the completion of the fluxing operation.

### Chlorine is common flux

Of the gaseous fluxes used for aluminum, chlorine is probably the most common and the least expensive. It is generally considered to be the most effective.

Nitrogen can also be used, but it must be extremely dry if its use is not to constitute a considerable hazard. When nitrogen is used, it should be preceded by a solid flux of the anhydrous chloride or fluoride type.

When either gas is used, a refractory tube is first inserted into the melt so that the gas can be fed to the bottom of the melting pot. The tube must be absolutely dry before inserting into the melt. Feeding from the bottom helps promote good gas distribution throughout the heat.

As the flux gas circulates upward through the melt, it carries along with it absorbed hydrogen. This hydrogen is finally released at the melt's surface. Chlorine gas actually combines with the hydrogen to form a chloride. The fluxing gases also provide mechanical agitation necessary to float suspended oxides to the surface of the melt.

For best results, it is necessary to carefully adjust the rate of gas delivery. In general, turbulent bubbling should be avoided. Most desirable is a gentle rolling action at the surface of the melt.

Solid fluxes are widely used, especially in open-hearth melting. For this application, they provide a blanketing effect atop the melt.

As a general rule the metal is first melted and heated to a temperature of from 1250 to 1400°F before flux is added. Where scrap or magnesium-containing metals are being melted, though, it's considered better practice to sprinkle the flux over the charge as it's being put into the furnace.

One typical solid flux contains about 37 pct magnesium chloride and 63 pct potassium chloride. This mix is thickened just before use by a 20 pct addition of calcium fluoride.

### No prescribed amount

There are no rigidly fixed rules for the optimum amount of flux required. Usually, the amount is roughly determined by watching its action with the melt. The flux is stirred into the dross. Flux is added until the dross becomes powdery or granular. The dross can then be easily removed by means of a perforated skimmer.

**Machining**
**Blanking**
**Forming**
**Welding**
**Brazing**
**Fastening**
**Extrusions**
**Finishing**

# Ways To Get The Most From Aluminum

**Aluminum is a readily workable metal. That, in part, accounts for its many and varied uses.**

**There's one major hitch. Make sure you use the right fabricating process for the alloy you've chosen.**

**Select the alloy and process with care and you'll get the results you expected. Here are some of the more important ways to avoid getting sidetracked.**

◆ ALUMINUM is one of the easiest metals to machine. If your final product requires machining —any machining at all—this outstanding selling point should figure importantly in your choice of metal.

Because aluminum alloys differ in chemical, metallurgical, and physical properties, they do not all machine alike. Nor is there one machining procedure that can provide optimum results for all alloys. With this in mind, it is essential to adapt your machining procedures to a particular aluminum alloy.

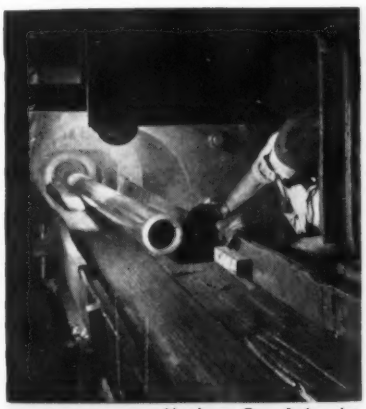
Aluminum alloys, even in the heat treated condition, are still relatively soft. Clamping or chucking of these materials calls for the exercise of reasonable care to avoid damage or distortion. When heated, aluminum expands about twice as much as steel. For dimensional accuracy, aluminum should be kept cool during all machining operations. This rule applies particularly to finishing cuts.

Three factors greatly influence the relative machinability of aluminum alloys: chemical composition, metallurgical structure, and heat treatment or temper. Many aluminum alloys are particularly easy to machine. They produce small chips, good surface finish, and result in negligible tool wear.

But alloys high in silicon content, despite other advantages, are highly abrasive to both carbon and high-speed tools. For optimum results, these alloys call for the use of cemented carbides.

Of the cast alloys, those containing significant amounts of copper, magnesium, or zinc are usually easiest to machine. This means that speeds can be kept on the high side and rake angles need not be large. Cutting the silicon-containing cast materials, however, usually calls for reversed conditions. Feeds and depth of cut should be reduced. Rake angles should be increased.

The relative machinability of wrought alloys can be readily simplified if we think of these materials as belonging to one of two general classes. Heat treatable alloys are easiest to machine. Some are specifically classified as "free machining." Non-heat treatable alloys do not machine quite as well. However, strain hardening tends to improve both their mechanical properties and their relative machinability.



Aluminum Co. of America

**EXTRUDED aluminum pipe emerges from the die of a hydraulic extrusion press ready for use.**

### Machine correctly

In general, all aluminum alloys —even the softest—can be satisfactorily machined when correct procedures are employed. Because the softer materials tend to be "gummy," they usually require generous rake angles. Tools must be kept sharp and well polished. Feeds and depths of cut must be adjusted to provide for an acceptable surface finish.

Based on both laboratory tests and shop experience, Alcoa charts

six general principles which should be followed in the machining of aluminum:

1. Grind more rake on the cutting tools than is common for machining steel.

2. Provide additional space for chips to form and be expelled from the tools.

3. Design tools so that chips and cuttings are directed away from the finished work.

4. Keep cutting edges sharp and free from burrs or wire edges.

5. Maintain smooth, bright, tool face surfaces free from scratches.

6. Employ high machining speed, moderate feeds and depth of cut.

### Select tools carefully

Major economies often result from proper tool selection. Four types of tool materials can be used to machine aluminum. Plain-carbon tool steel is the least expensive. It is usually quite adequate for machining a limited number of parts. It will stand up best at slower machining speeds.

High-speed tool steel provides far better abrasion resistance and is generally tougher than an unalloyed steel. Of all materials, it is the one most widely used for machining aluminum. One very popular alloy is the 18 pct W, 2 pct Cr, 1 pct V tool steel. A balanced molybdenum-tungsten type steel is also noted for its good performance in machining aluminum products.

Cemented carbides are frequently preferred for large production runs. They combine extremely high hardness with excellent wear resistance. Alloys containing large amounts of silicon often require the use of carbide tools. Most popular for machining aluminum are the straight tungsten-carbide grades.

Specially mounted diamond tips are sometimes recommended for light finishing cuts. They are capable of producing a very high surface finish along with tight dimensional control. But because of their high cost, their use is generally restricted to special applications. Most shop applications cannot justify the use of diamond tips.

Shearing and slitting aluminum follows conventional techniques. A few precautions, however, are well worth remembering. Because aluminum is fairly soft, all hold-down pads should be faced with rubber—especially for guillotine shearing. Cutting beds and tables should be clean and smooth. If this is not the case, heavy cotton flannel may be shellacked to those surfaces to prevent scratching or scuffing.

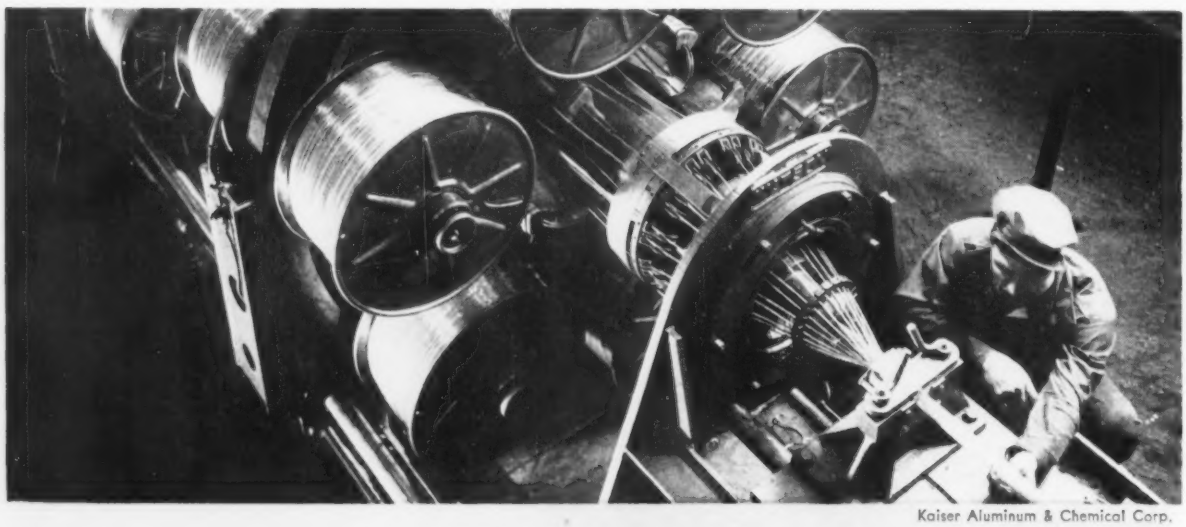
The successful blanking of aluminum sheet calls for proper punch and die clearances. Standard tables for calculating the right clearance may be obtained from your aluminum sheet supplier. These are easy to follow and should never be disregarded.

### Grind blanks and dies

The working surfaces of both blanking punches and dies should be ground. The quality of the cutting edges contributes importantly to the quality of the cut. Although both punches and dies should be made of tool steel, it is preferable that the punch be used in the annealed condition. Dies should be hardened and tempered.

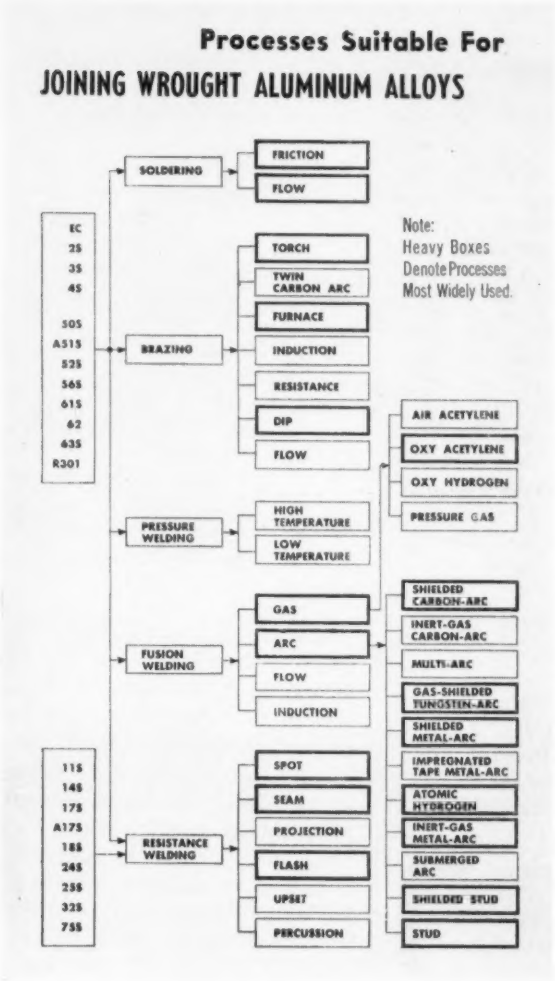
There are more than a dozen major operations that can be used in fabricating parts from aluminum sheet. All require careful planning and adequate tooling. Alloy selection must also be integrated with forming requirements of the job.

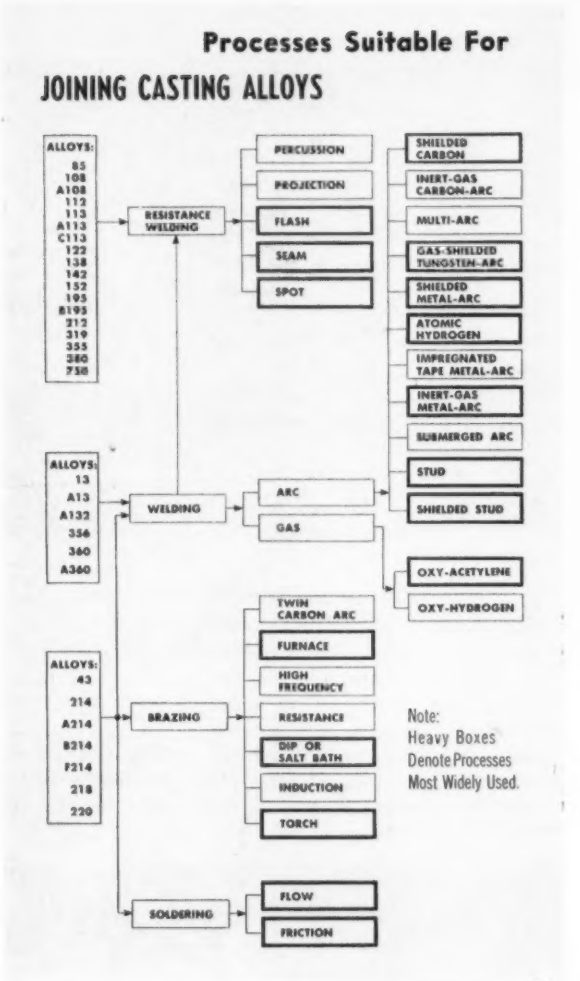
As a rule of thumb, the formability of any metal is closely linked with the metal's mechanical properties. Aluminum forms well, requiring considerably less energy than the heavier metals. Still, its relative formability is heavily dependent upon hardness



Kaiser Aluminum & Chemical Corp.

**CLUSTER of bobbins feeds aluminum wire into cable. Much of this type of cable is now being used in electrical power line applications. As a conductor material, aluminum has many advantages.**




and ductility. Both chemical composition and temper can influence these properties.

An increase in hardness tends to decrease both plastic and elastic ranges. Consequently, the harder the material, the more difficult it is to form. Permanently forming to a desired shape implies that the metal must be stressed beyond the yield point. A lower yield point usually makes the forming operation that much easier.

For the proper bending of aluminum, it is necessary to take into account both hardness and thickness. Standards have been established for bend radii, and these should be scrupulously followed. An arbitrary choice of bend radius may result in malforming or actual fracture.

Continuous roll-forming is recommended for large production quantities. Its major limitation is that it can handle longitudinal forming only. Since initial equipment and tooling costs are comparatively high, roll-forming should be approached with caution. Equipment costs can best be justified in terms of either production quantities or specific labor-saving advantages.

Aluminum and its alloys can be readily welded, brazed, or soldered. Welding can be accomplished by almost any of the known welding techniques including gas, resistance, arc, induction, flow, and pressure. Considering the various refinements of each major welding technique, there are at least 30 different methods available for welding aluminum.

Pure aluminum melts at 1216°F. Many aluminum alloys melt at even lower temperatures (900°-1000°F). These melting points are from 1300° to 1600°F below the melting point of steel. Such details are important in understanding the welding techniques used for aluminum.

The low melting points involved require the welder to take certain precautions. Obviously, overheating must be avoided. But since areas adjacent to the weld zone are likely to be in a semi-molten condition during heating, these areas must be properly supported to prevent sagging, shrinking, or collapse.

### Control temperature

Aluminum does not undergo a color change as it approaches the melting point. There are no visual warning signs such as occur during the heating of steel. However, as soon as the surface temperature is brought up to the melting point, the surface takes on a "wet" appearance. This is positive evi-

dence of surface melting.

Both pure aluminum and aluminum alloys are normally covered with a thin oxide film. This film must be removed in most cases before welding, brazing, or soldering can be accomplished. Removal may be handled by mechanical means or by use of a flux designed for the purpose.

Two factors are most important in determining whether the aluminum alloy of your choice can be welded or otherwise joined by one or more of the available commercial processes. One is the copper content of the alloy. The second important factor is its magnesium content.

### Avoid embrittlement

When copper content is 3 pct or higher, the weld metal will become seriously embrittled if fusion welding is employed. Heat affected zones will suffer adversely in terms of mechanical properties. For these reasons, fusion welding is definitely not recommended for high-copper-containing alloys.

A high magnesium content promotes oxide formation at the heated surface. Consequently, alloys high in magnesium are not particularly suitable for most brazing or soldering applications. They can be satisfactorily joined by other methods—including certain welding processes where oxidation is not a factor.

With few exceptions, all of the commercial non-heat-treatable alloys of aluminum can be readily welded. The heat-treatable alloys are somewhat less suitable for welding, largely because the process results in a loss of heat treated properties. In other words, the weld-affected areas are rapidly annealed during welding. These materials can, however, be heat treated again after welding without sacrifice of strength.

Among the more widely used methods for welding aluminum is the gas or fusion welding method. This method makes use of a torch flame fed with oxy-hydrogen, oxy-acetylene, or other available gas combinations. It is usually confined to materials from 1/32 in. to 1/8 in. in thickness. It is not recommended for those alloys containing 3 pct or more of copper.

Arc welding provides four different processes for welding aluminum: metal-arc, carbon-arc, atomic-hydrogen, and inert-gas-shielded arc welding. The last process is the newest and possibly the most successful. In general, however, arc welding methods claim the advantages of speed, elimination of flux, and easier edge preparation.

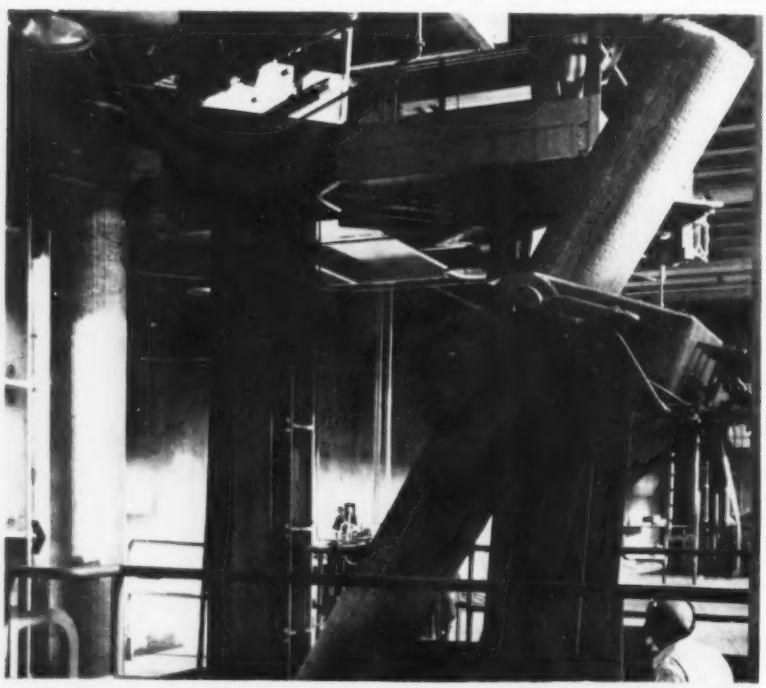
Induction welding is less widely used but seems to have a strong future potential. It involves the flow of high frequency current through the edges of the materials to be joined. The current flow results in rapid heating, melting of the edges, and the formation of strips of liquid metal. The liquid strips form a cohesive bridge between the two edges. Heating speeds are phenomenal, often requiring no more than a few hundredths of a second.

### Try resistance

Resistance welding methods (spot and seam) are especially useful in fabricating the heat-treatable aluminum alloys. Heating is rapid and confined to an extremely limited area. This means that the heat treated materials suffer no appreciable loss in strength. Spot welding is often used as a substitute for riveting.

Brazing aluminum is an art to which considerable amounts of science have been added. Essentially, it is a method of joining that makes use of an alloy whose melting point is slightly below that of the materials being joined. The parent metal never gets hot enough to melt. This is the basic difference between welding and brazing.

Brazing may be done with a torch, or in a furnace, or by means of dipping in a molten flux bath. An induction heating coil has sometimes been substituted for ordinary torch brazing. Both flux and capillary action are common to all of these methods. Capillary action causes the filler metal to flow into the joint to be brazed. Flux removes oxide films and thereby guarantees penetration.



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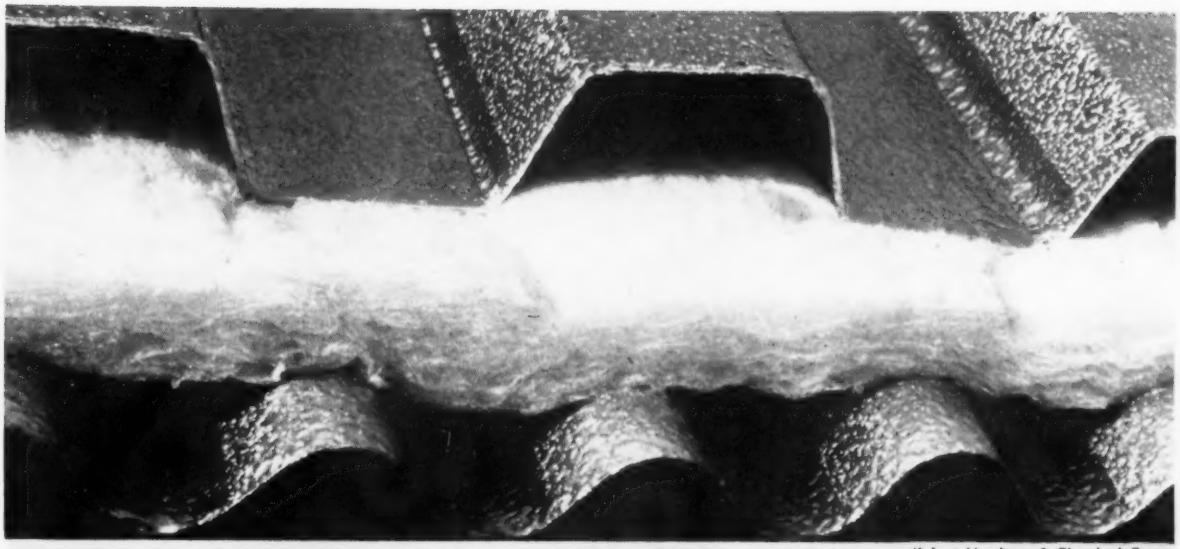
**ALUMINUM extrusion billets are made in 20-in. diameter and up to 24 ft in length. This massive billet is intended for use on an 8,000-ton extrusion press that will produce special shapes.**



Kaiser Aluminum & Chemical Corp.

**CLOSE-UP view of an aluminum field-fabricated sandwich wall panel. This panel has a box-ribbed embossed siding as the exterior. Insulation is provided by the sturdy one-inch blanket of glass fiber.**

Most experts agree that good brazing begins with proper design. Joint and fillet design, in particular, must be pre-planned. Another important requirement is the maintenance of correct location of pieces that are to be joined by brazing.

The advantages to be gained by brazing aluminum are numerous and important from a cost reduction standpoint. The heat-treatable aluminum alloys, for example, can be readily furnace brazed and quenched directly from the brazing furnace. High production rates can be achieved by brazing a large number of joints in a single operation.

As a rule, brazing requires considerably less skill and "know how" than welding. This means it can often be handled by relatively unskilled personnel. Despite this fact, brazing lends itself to highly complicated assemblies and even inaccessible joints.

### Cuts finishing costs

Because of advantageous joint shapes, brazed aluminum parts combine good stress distribution with high fatigue resistance. Smoothly brazed joints require little or no polishing. This can result in appreciable savings in finishing costs. Thanks to low brazing temperatures, distortion of thin sections is minimized.

Soldering, as applied to aluminum, is more likely to be successful on smaller parts. One authority sets a practical part size maximum at about 20 square inches. This limitation arises from two factors primarily. On the one hand, aluminum is an excellent conductor of heat. This makes it difficult to concentrate moderate heat for soldering on larger sections. Distortion is a second obstacle. Torches are recommended over soldering irons for most applications.

A wide variety of mechanical fastening methods are also used to join aluminum assemblies. Riveting is one such method. Its popularity derives from the fact that it is relatively inexpensive and produces a sound joint. It is frequently faster than the application of screws and bolts.

Although welding is sometimes cheaper, riveting produces a high degree of structural uniformity. Cold rivets have absolutely no effect upon the strength or other properties of heat treated alloys. Thus it is not necessary to compensate for loss of strength by using a heavier gauge material. Visual inspection is usually all that is required to detect defective rivets.

Rivets can be used in either lap joints or butt joints. In a lap joint, the plates actually overlap each other. In a butt joint, the plate ends are located flush to each other. A union is then made by means of one or more cover plates or straps. The strength of either type of joint can be closely calculated.

### Rules for riveting

Reynolds Metals Company lists seven general conclusions drawn from tests of various riveted joints. They serve as a helpful guide in designing riveted structures:

1. Riveted joints in double shear have better fatigue strength than single shear.

2. Fatigue strength tends to increase with increased number of rows of rivets.

3. The variation in fatigue between hot and cold-driven aluminum rivets is negligible.

4. Cold-driven steel rivets are better in fatigue than hot-driven rivets.

5. Fatigue strength increases with size of rivet.

6. Fatigue strength of joints varying in alloy have the same relation as the strengths of the basic alloy.

7. Butt-riveted joints have greater fatigue strength than lap joints. Similarly, a butt joint hav-

ing a double splice plate will have greater fatigue strength than one having a single splice plate.

In addition to the many types of rivets, there are available in aluminum both standard and special screw fasteners. Perhaps the major advantage of any screw fastener is that it permits both disassembling and reassembling. Types of aluminum screw fasteners are counted in the thousands. They have been designed to meet every conceivable fastening requirement.

Two other methods of fastening are also available to users of aluminum: metal stitching and mechanically formed joints. Metal stitching is a form of stapling. It is fast, requires no backing strip, and can be readily performed by semi-skilled workmen. In terms of speed, stitches can be applied about ten times as fast as rivets. They're just about twice as fast as spot welds.

The extrusion of aluminum into special shapes is certainly one of the major industrial developments of the present century. It is a development that has greatly enlarged upon the possibilities of low-cost design and fabrication. By incorporating many manufacturing processes in the form of specially extruded shapes, it contributes to savings in time, money, and manpower.

The aluminum extrusion starts out as a cast cylindrical billet. To provide for plasticity, this billet is heated to about 700°F. By means of hydraulic pressure, the heated billet is then forced through a steel die. This die can assume a variety of shapes to provide the astonishing variety of aluminum extrusions now available.

### Leaves fabricator leeway

The design of aluminum extrusions provides the fabricator with extraordinary latitude and versatility. It is possible, for example, to permit or facilitate joints with other members by adding or taking off flanges or ribs. It is also possible to either increase or decrease thickness across part of a section. Because of these and other features, the use of aluminum extrusions tends to spell above-average design flexibility.

Similar latitude is to be found in the choice of finishes now available to users of aluminum. In their simplest form, these finishes may be no more than a routine polish or scratchbrushing to produce a desired surface appearance. Or they may entail special organic or inorganic coatings intended either to improve appearance or promote specific engineering properties.

When either organic or inorganic coatings are to be applied to an aluminum surface, cleaning is always an important prerequisite. For only a chemically clean surface can provide good adhesion. Failure to observe this rule often results in costly rejection or time-consuming rework.

A number of different textures can be obtained on aluminum by means of chemical dipping. Both acid and alkaline reagents can be used for this purpose.

To produce a frosted finish, sodium hydroxide is commonly used. It tends to create an attractive sparkle like that of finely etched glass.

There are also available a variety of proprietary dips such as "Alodine" which protects and decorates aluminum while reducing its reflectivity.

Vapor degreasing and alkaline cleaning are perhaps the two simplest and fastest ways of freeing aluminum of dirt, grit, grease, and other surface contaminants. Vapor degreasers are now fairly commonplace in most metalworking plants. They clean by means of the vapor produced from hot chlorinated solvents. The most common solvents used are trichlorethylene and perchlorethylene. The cleaning cycle seldom requires more than about 30 seconds.

Alkaline cleaners for aluminum frequently contain tetrasodium pyrophosphate along with an inhibitor such as sodium metasilicate. The combination serves to break up oil and grease into small globules which are floated away from the metal surface. The inhibitor prevents chemical attack of the metal. Alkaline cleaning cycles are fairly rapid and are usually followed by a rinsing cycle.

Mechanical finishes widely used on aluminum include grinding, buffing, coloring, scratchbrushing, spin finishing, tumbling, and sandblasting. For decorative purposes, hammering and fluting are also employed.

From an engineering standpoint, finishing aluminum with an electrolytic oxide coating has many advantages. Principally, it provides the part with a very hard coating that is relatively inert chemically. Some of these coatings are transparent. Others can be produced in varying shades of brown, gray, and silver.

### Clean well

Aluminum can be readily electroplated. The preliminary or "base" coating usually deposited prior to the finished coating is zinc. This coating may be extremely thin and provides excellent adhesion. It is deposited by means of a zincate solution. Normal immersion times vary from 15 to 45 seconds.

After zincate coating, aluminum can be copper plated in a cyanide-rochelle salts solution. The bath is maintained at about room temperatures (70°-80°F). Current density varies from 8 to 24 amps per square foot at 2 to 3 volts. The copper coating obtained is frequently used as a pre-coating for brass, nickel, or chromium.

Other available electrolytic coatings that may be plated on aluminum include black nickel, tin, cadmium, silver, gold, platinum, palladium, rhodium, and porous chromium.

ACKNOWLEDGMENT

**The editors want to thank the purchasing, production, and engineering people whose ideas and practical suggestions helped make this feature possible. Also, they want to acknowledge the generous assistance of The Aluminum Association, Aluminum Company of America, Kaiser Aluminum & Chemical Corp., and Reynolds Metals Company.**

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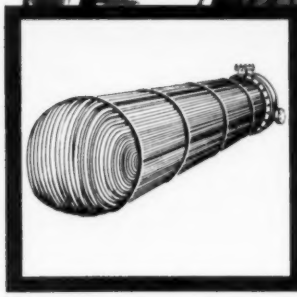

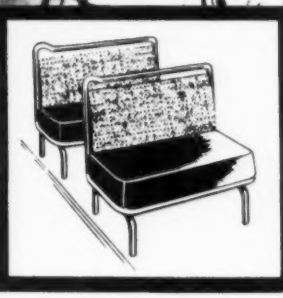

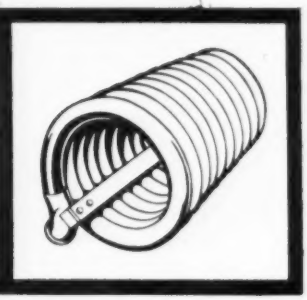

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# New Technical Literature:

## Catalogs and Bulletins

### Conveyor lubricators

Automatic conveyor lubricators are presented in an 8-page catalog just released. It describes seven fundamental improvements included in the design of two new models. *J. N. Fauver Co., Inc.*

For free copy circle No. 1 on postcard p. 81

### Arc welder

A new 41-page arc welding machine and accessory catalog is now available. Selenium rectifier and dc motor generator arc welders for industrial welding, ac and dc engine driven arc welders for construction and maintenance, and ac transformer arc welders for plant and shop use are illustrated. Specifications for each machine, from ampere ratings to outside dimensions, are included. *Air Reduction Co., Inc.*

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### FOR YOUR COPY

***Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 81.***

### Batteries

Batteries for use with hand motorized lift trucks are the subjects of a new available bulletin. The specifications include data on battery ratings and capacities, details of design and construction, dimensions, and weights. *C & D Batteries, Inc.*

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### Furnace

A presently available data sheet announces a new pit furnace for use with or without a protective atmosphere at temperatures to 1450°F. This furnace will perform nitriding, bright tempering, steam tempering, annealing, bluing, and all low temperature non-atmosphere heat treating with only minor equipment changes, it states. *Hevi-Duty Electric Co.*

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### Pumps

Close-coupled industrial pumps are reviewed in a dozen page booklet. An easy to use table determines horsepower, capacity and head for vertical pumps. It also contains sectional views, material specifications, schematic application drawings, and photos of installations. *Layne & Bowler Pump Co.*

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### Miniature switches

Subminiature screwdriver actuated switches are presented in a preliminary data sheet. The literature describes the switch as a single-pole, double-throw subminiature unit. A 90° turn with a screwdriver operates it. The slotted head gives visual indication of the switch's position. Major advantage listed: saves wiring, panel space. *Micro Switch Div., Minneapolis-Honeywell Regulator Co.*

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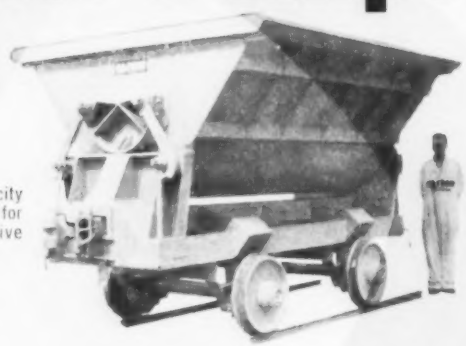
Rocker Dumps



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## Machinery parts

A booklet on alloy machinery parts has been expanded to include data on chemical compositions, physical and mechanical properties, corrosion resistance, and machining. Separate chapters cover cobalt-base, nickel-base, and iron-base alloys. *Haynes Stellite Co.*

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## Refractories

Refractory products are listed in new literature. This bulletin lists brand names, typical applications and special services available. The products list includes information on all classes of fire clay brick plus 70-pct alumina brick. *The Ironton Fire Brick Co.*

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## Plated thin strip

Tin plating non-ferrous thin strip metals is discussed in a sheet now ready for distribution. Included on the informative sheet is an 0.002-in. thick sample, with tin coating of 0.00008-in. on two sides. *Somers Brass Co.*

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## Cutting tools

Turning and cutting tools are introduced and listed in a presently obtainable booklet. It contains data on one brand of cutters. Included are: advantages, turning tool types, rectangular blank styles, lathe and grinder center blanks, inserts for use with standard insert-type tool holders, throwaway inserts, toolholders and more. *Diamonite Products Div., United States Ceramic Tile Co.*

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## Stainless

Stainless steel types 308, 309 and 310, which have increased chromium and nickel content over stainless steel types 302 and 304, are discussed in a booklet now being distributed. It contains physical properties, heat treatment, strength at elevated temperatures and fatigue strength. Resistance to oxidation is also covered. *Allegheny Ludlum Steel Corp.*

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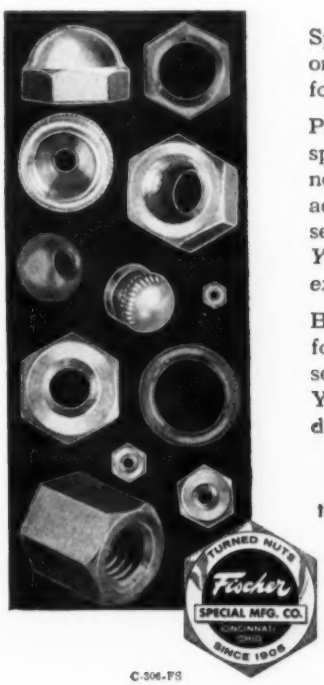


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Bunke-Musser also experimented with carbon steel. But this required use of heavier gage, chrome plating and polishing, with the end result being much more expensive than stainless steel.

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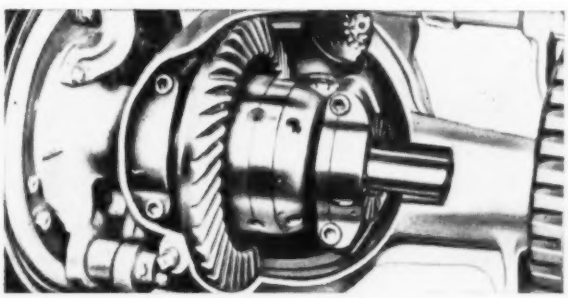

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### Self-priming pumps

Presently available technical bulletins present data on self-priming centrifugal pumps. These, the literature explains, are highly efficient, simple and dependable. Applications, designs and specifications are illustrated and explained. *For free copy, write on company letterhead to: Gorman-Rupp Co., Mansfield, Ohio.*

### Substations

Four basic arrangements of rural package substations are shown in a new bulletin. The 32-page publication contains photos, diagrams and information on several types of substations. *For free copy, write on company letterhead for catalog GEA-5276C, to: General Electric Co., Schenectady 5, N. Y.*

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### Fasteners

Stainless steel fasteners appear in a brochure just published. It describes government specification aircraft bolts, slotted and Phillips machine screws, flat and round rivets, and washers carried in stock. Illustrations, stock sizes, principal dimensions, and explanation of part and dash numbers are included for each item. *Allmetal Screw Products Co., Inc.*

**For free copy circle No. 13 on postcard p. 81**

### Rubber roll care

Maintenance of rubber rolls is the subject of a recently published report. A handy table lists faults commonly found in rubber rolls, together with recommended treatments. Also presented is a thorough discussion of maintenance techniques, with recommendations about problems involving grooves, cracks and surface damage, lubrication, cleaning, transportation and storage. *Rodney Hunt Machine Co.*

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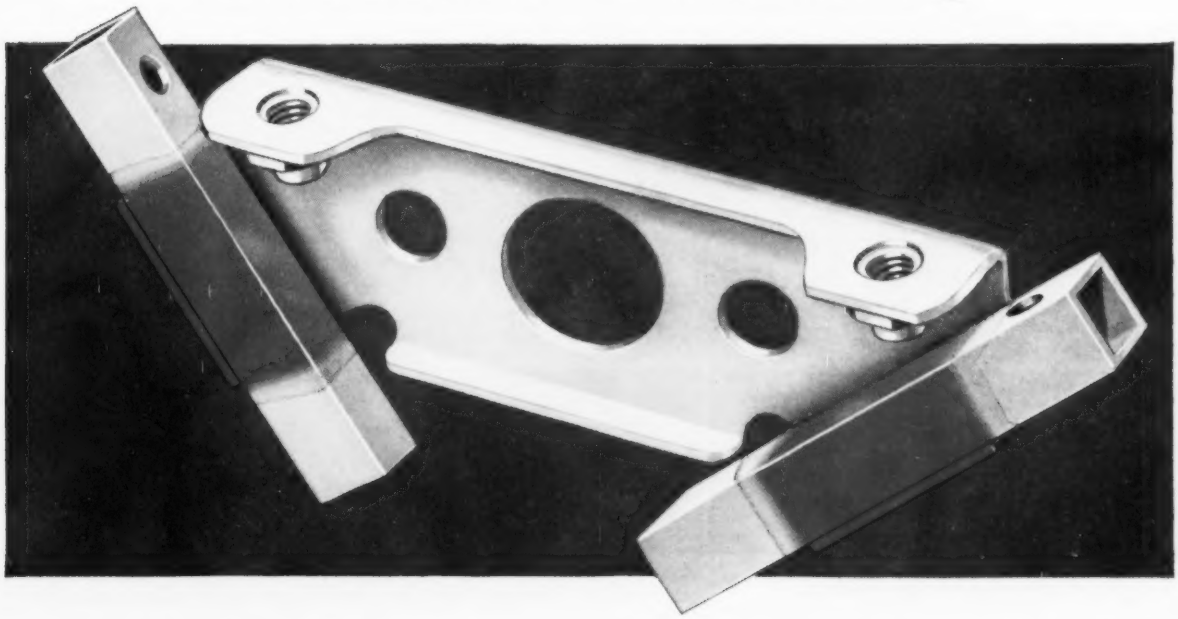
### Evaporation reducers

Expanded polyethylene floats for cutting evaporation of open liquids as much as 75-pct, are illustrated in a new catalog sheet. The miniature floats contain thousands of tiny air cells for buoyancy and light weight. The manufacturer's literature says that they exhibit outstanding chemical and solvent resistance. They withstand rough use and cannot be punctured or broken, it states. *American Agile Corp.*

**For free copy circle No. 15 on postcard p. 81**

# Jack & Heintz Saves $15.84 Per Hour...

## *with TOCCO® Induction Brazing*



**Brazing Costs Down**—When Jack & Heintz engineers switched from torch brazing to automatic induction, brazing cost of these inverter brush mounts fell from $.05 to $.006 each—a reduction of 83% in direct labor costs alone! Additional savings result because less cleaning is required after TOCCO, and fuel costs are much lower, too.

**Brazing Production Up**—While costs dropped, production on the part zoomed—from 40 to 360 brazed assemblies per hour. Furthermore, rejects and scrap, formerly high, are now negligible.

**Versatility**—The part shown is just one of over 25 parts, large and small, which alert J & H engineers have converted from old-fashioned brazing methods to modern, automatic TOCCO. Overall brazing costs (TOCCO brazing versus former methods used) are down 75%—brazing speed, up 100%.

If the manufacture of your product involves brazing, heat-treating, forging or melting of ferrous or non-ferrous metals, don't overlook TOCCO as a sound method of increasing production, improving product quality and slashing costs.

**THE OHIO CRANKSHAFT COMPANY**

*Mail Coupon Today* — NEW FREE Bulletin

**The Ohio Crankshaft Co. • Dept. A-1, Cleveland 5, Ohio**

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

**Name**_____

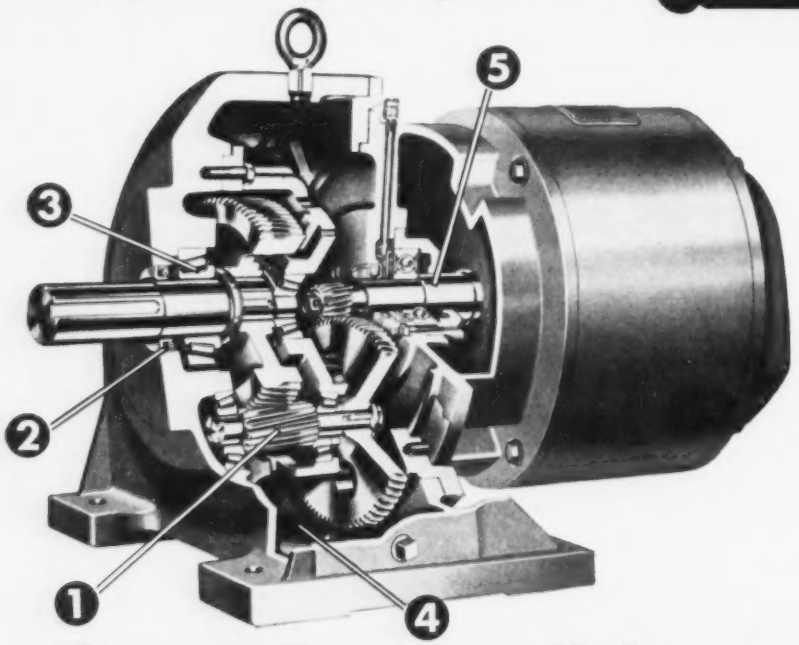
**Position**_____

**Company**_____

**Address**_____

**City**_____ **Zone**____ **State**_____

# new packaged-power GEARMOTOR




1. HELICAL GEARING assures silent operation, increased strength, longer life and minimum friction loss. Teeth are crown shaved and induction hardened for optimum performance.
2. TWO-WAY SEALS lock oil in, and seal dirt out.
3. OVERSIZE THRUST BEARINGS handle big overhung loads.
4. OIL BATH LUBRICATION keeps gears and bearings continually showered with clean oil.
5. HEAVY SHAFTING, heat treated alloy steel, eliminates possibility of bending or twisting under heavy loads.

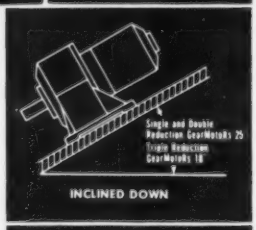
## . . . gives you these unexcelled construction features

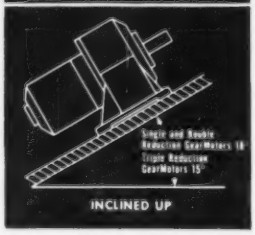
## . . . plus real Mounting Flexibility

Exceptional compactness and flexibility eliminate need for costly, special gear units to fit difficult and unusual mounting conditions. For mountings inclined more than shown, a special oil seal arrangement is provided.

For Vertical shaft-down applications, a special Vertical GearMotoR provides a completely leakproof output shaft, through the exclusive Philadelphia "Dry Well" housing construction.

Send for Catalog GM-560 which fully describes and illustrates the new Philadelphia GearMotoRs, Utility type GearMotoRs, In-Line Reducers and Motorized Worm Gear Drives.

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MEMO TO: *You*

YOU MIGHT AS WELL try to count the beans in a carload as the number of parts that are made of Roebling High Carbon Specialties, Flat Wire and Spring Steel. These Roebling products are unsurpassed for mechanical and dimensional uniformity . . . for speeding manufacturers' production and cutting costs.

Next time you order cold rolled high carbon wire or spring steel specify Roebling. Strictly on its performance you'll probably become a steady customer from then on. John A. Roebling's Sons Corporation, Trenton 2, N. J.

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ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6, N.Y.

# INJUN GAME NOT TOO TAME

**(Junior's control helps make a goal!)**

**PRINCESS WENATCHEE:**
*"Another goal for Junior! Control help him win."*

**CHIEF KEOKUK:**
*"Control? He trip me up."*

**CHIEF KEOKUK JR.**
*"Injun Lacrosse, like any game — not too tame!"*

Control can net a profitable return in Lacrosse . . . and in processing iron and steel! Foundries and steel plants everywhere control costs and quality with Keokuk Silvery Pig Iron . . . the superior form of silicon introduction. Pig for pig, car for car, its uniformity never varies. Handle it by magnet . . . charge it by weight (or count the piglets for equal accuracy). Leading aluminum producers specify Keokuk Silicon Metal for uniform high purity. When you think of silicon, think of Keokuk!

**KEOKUK ELECTRO-METALS COMPANY** KEOKUK, IOWA
Wenatchee Division, Wenatchee, Washington

**SALES AGENT: MILLER AND COMPANY**
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Keokuk Silvery Pig Iron is available in 60 and 30 pound pigs and 12½ pound piglets . . . in regular analysis or alloyed with other elements to match your requirements.

# FREE TECHNICAL LITERATURE

**These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.**

**This section starts on p. 74.**

## Phenolics

Phenolic molding materials and resins are described in an illustrated brochure. The 12-page catalog includes technical data, special properties and product features of phenolic molding powders, rubber phenolic molding powders, phenolic laminating varnishes, and industrial and foundry resins. *Chemical Materials Dept. General Electric Co.*

**For free copy circle No. 16 on postcard**

## Cold galvanizing

Cold galvanizing that rustproofs iron and steel surfaces, prevents corrosion at welded joints and repairs damaged galvanized surfaces is illustrated in a new folder. It can be applied by brush or spray gun to produce a coating containing approximately 95-pct metallic zinc. The folder also tells how the compound is a time-saving preparation for making galvanizing repairs away from the plant. It is non-toxic, will dry to the touch in 15 to 30 minutes. *American Solder & Flux Co.*

**For free copy circle No. 17 on postcard**

## Barrel finishing

Interested in reducing production costs 80 pct or more? Who isn't! Well, a folder now available tells how this can be done with a particular precision barrel finishing method. It illustrates and describes barrel finishing processes for: deburring, micro-finishing, speed polishing, grinding, honing, coloring and burnishing. It explains how to save valuable man-hours with this equipment. *Speed-D-Burr Corp.*

**For free copy circle No. 18 on postcard**

## Plant location

Jumping from eighth to sixth in electronics and electrical machinery manufacturing, a state's promotional literature reveals increases by all its major industries. Total value of the state's manufacturing in 1955 was $6,482,000,000, compared with $6,121,000,000 in 1954. Manufacturing employment rose to 470,000, compared with 441,000. "Scientific research is today the state's outstanding industrial development," declares the reading matter. It covers such subjects as industrial and atomic research, education of engineers and technicians, training of skilled local craftsmen, out-migration of labor from farms, growth and location of established industry, comparative availability of workers in every section of the state, the state's effort to attract new industry, and the availability of capital for industrial development. *North Carolina Dept. of Conservation & Development.*

**For free copy circle No. 19 on postcard**

## Ballistic computer

Ballistic computers employed for the study of nonrecurrent phenomena are covered in a new booklet. The computer is employed in quantitive study of strain, load, torque, displacement and acceleration. It works wherever a transducer can convert a phenomenon into an electrical potential. The computer working from a transducer presents peak readings, action time, and delay time. It can be used also in conjunction with a camera. *Allegany Instrument Co., Inc.*

**For free copy circle No. 20 on postcard**

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| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
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## Comparator

A bench-model comparator is featured in presently obtainable descriptive information. It gives the range and accessories available. The comparator quickly and accurately checks pitch diameters on splines and gears (externally or internally); lengths of parts; shoulder distances; center to center; outside and inside diameter dimensions; etc. *Jerpbak-Bayless Co.*

**For free copy circle No. 21 on postcard**

## Threading machine

Containing eight pages, a new brochure describes a threading unit. The single spindle machine does precision threading of small diameter workpieces. Having a No. 4 to $\frac{5}{8}$-in. range, it produces threads to class 3 and 4 tolerances on a production basis. *Landis Machine Co.*

**For free copy circle No. 22 on postcard**

## Ventilators

Power roof ventilators are pictured and described in a presently available 8-page bulletin. It gives construction, operation and design features of four models in an improved line. Complete performance data for 16 sizes of up-blast type exhaust ventilators, 21 sizes of hood type exhaust ventilators and 20 sizes of hood type supply ventilators are tabulated. *American Blower Corp.*

**For free copy circle No. 23 on postcard**

## Cut-off machines

Abrasive cutting machines, the best way to cut many materials and the only way to cut some, are graphically explained in a 4-page folder. *Campbell Machine Div., American Chain & Cable Co.*

**For free copy circle No. 24 on postcard**

## Industrial pumps

Industrial pumps available from one manufacturer are listed in new reading matter. Motor mounted, direct connected and belt driven pumps are described. It contains data on high pressure, bulldozer and centrifugal pumps. *The F. E. Myers & Bro., Co.*

**For free copy circle No. 25 on postcard**

## Shears

Underdrive power squaring shears are thoroughly presented in a new 74-page booklet. It illustrates fully such features as: a multi-jaw sleeve clutch; rigid, box type construction; self-compensating holddown; fully enclosed drive; low outline for complete visibility; four cutting edge knives and a self-measuring back gage. *Niagara Machine & Tool Works.*

**For free copy circle No. 26 on postcard**

## High temperature alloys

High temperature, heat-resisting alloys are listed on a new selector guide. The chart gives data on comparative strengths at high temperatures, scaling resistance, individual characteristics and comparative prices. Alloys covered are: Inconel, Inconel X, Incoloy, Techalloy 80 Ni 20 Cr, stainless and heat-resisting steel types 330, 310, 314, A-286 and N-155. *Techalloy Co., Inc.*

**For free copy circle No. 27 on postcard**

## Milling machines

High-speed automatic milling machines suitable for slicing and dicing germanium ingots for transistors are announced in new literature. These millers are of the rise and fall spindle type; speeds run up to 10,000-rpm. Automatic mist lubrication is provided for spindle bearings and anti-friction overarm type arbor support. Diamond impregnated sawing disks up to 8-in. diam can be accommodated. Automatic transverse feed of 6-in., adjustable in increments from 0.001-in. to 0.085-in., is synchronized with automatic pneumatic feeds of the spindle head and table for high speed continuous slicing cycles. *Robert E. Morris Co.*

**For free copy circle No. 28 on postcard**

## Atomic rolling

"Rolling Mills for Processing Nuclear Fuel Elements," is a 12-page booklet. It discusses special equipment employed in rolling and fabricating new metals required for the atomic energy program. *Stanat Mfg. Co., Inc.*

**For free copy circle No. 29 on postcard**

# NEW

## KAYDON THIN SHELL NEEDLE BEARINGS

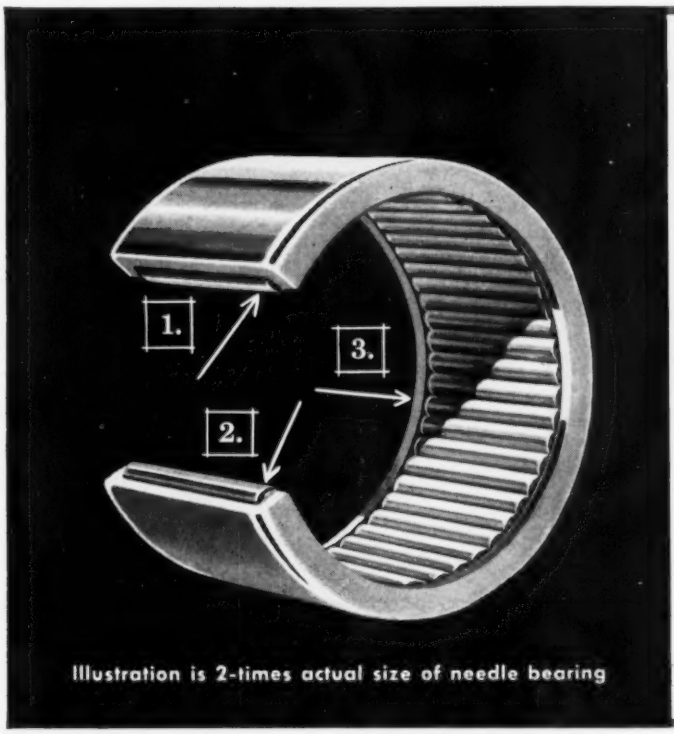
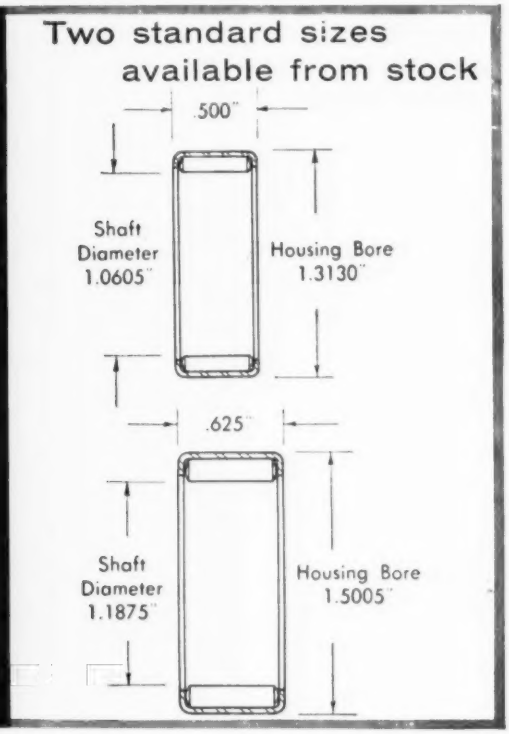



Illustration is 2-times actual size of needle bearing




## You get these Kaydon design advantages:

**1. Greater effective length needle rollers for MORE CAPACITY (41% on ½" width) . . . LONGER LIFE (2.8 times as much on ½" width) 2. Simplified construction that SAVES you money 3. Pre-packed lubrication that SAVES assembly time.**

### These new thin-shell bearings were developed with the co-operation of the FORD MOTOR COMPANY for use in FORD-O-MATIC and MERC-O-MATIC automatic transmissions

Kaydon's new thin-shell needle bearing gives more of everything — *more economy . . . more capacity . . . plus longer life* than any other comparable bearing. That's because of Kaydon's greater effective length of spherical end rollers.

This new bearing is ready for you right now from stock in two standard sizes (illustrated). Other sizes will be available later.

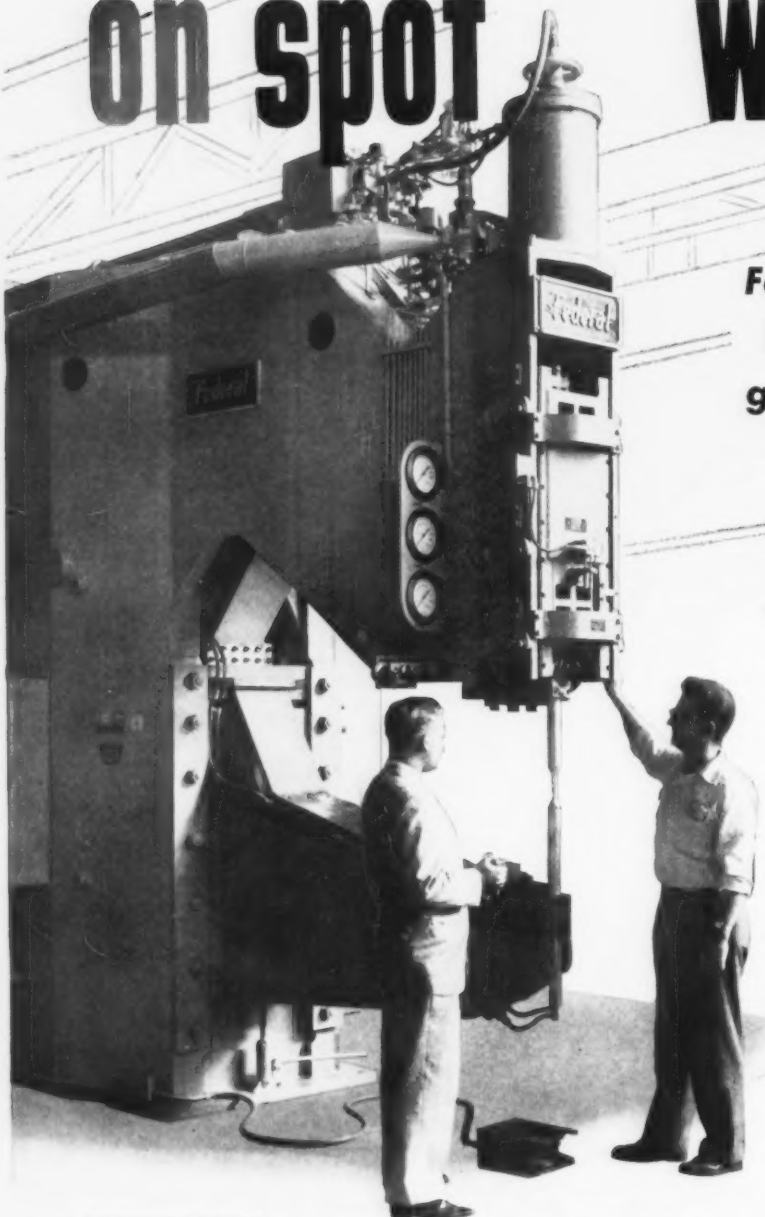
For complete specifications, ask for Data Sheet No. K562 — write, call or wire Kaydon of Muskegon.

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

*All types of ball and roller bearings — 4" inside diameter to 124" outside diameter . . . Taper Roller • Roller Thrust • Roller Radial • Bi-Angular Roller • Spherical Roller • Needle Roller • Ball Radial • Ball Thrust Bearings*

# ...the BIGGEST story on spot welding!



*Welding engineers testing record setting spot welder. Federal has been commissioned to build several more of these giants for aircraft manufacture.*

## *Federal Built 14 ft., 28 ton giant goes into operation on west coast . . .*

The biggest thing in aircraft spot welding—that's the huge new Federal Three Phase Frequency Converter Spot Welder designed to make spec plus welds on the tail section of a new commercial jet airliner.

More than 13 feet tall, the big welder weighs over 58,000 pounds, and has a special throat, or work clearance area, of some 2500 square inches.

The design and manufacture of the 12 ton unipolar transformer having an output in excess of 100,000 amperes and the requirements of meeting rigid deflection specifications on this large throat machine were just a few of the new problems encountered on this project. Federal experience and facilities once more provided the correct solutions.

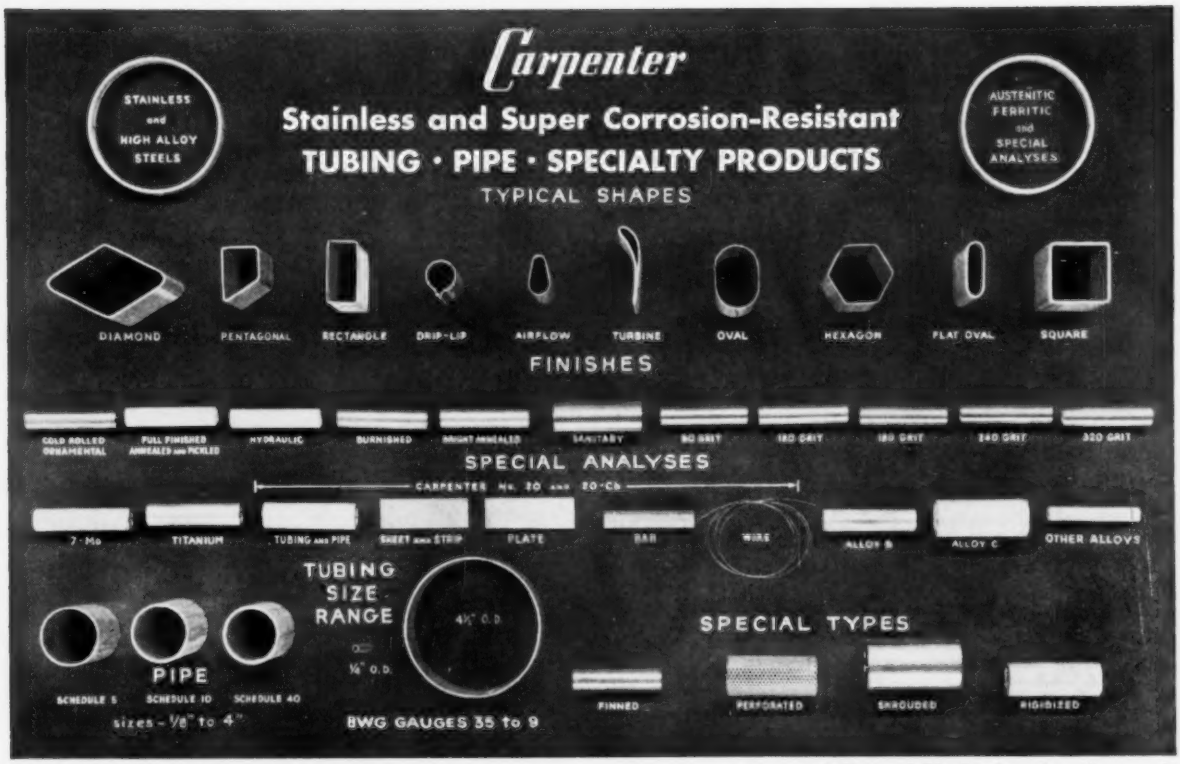
Here again, is proof that large or small—standard or special—*Federal Stays First in Resistance Welding.*

Federal WELDERS®

Warco PRESSES®

**The Federal Machine and Welder Co.**

**WARREN, OHIO**




(clip and file for handy reference)

# Do you know you can get all these cost-saving corrosion-resistant products from one source?

ATLANTA, GA.
J. M. Tull Metal & Supply Co., Inc.
BALTIMORE, MD.
Horace T. Potts Company
BEAUMONT, TEX.
Standard Brass & Mfg. Co.
BOSTON (Cambridge), MASS.
Brown-Wales Company
BUFFALO, N. Y.
Service Steel Division
Van Pelt Corporation
CHARLESTON, W. VA.
McJunkin Corporation
CHICAGO, ILL.
Cherry-Burrell Corporation*
CHICAGO (Franklin Park), ILL.
C. A. Roberts Company
CINCINNATI, OHIO
Service Steel Division
Van Pelt Corporation
CLEVELAND, OHIO
The Cleveland Tool & Supply Co.
DAYTON, OHIO
Service Steel Division
Van Pelt Corporation
DENVER, COLO.
C. A. Roberts Company
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Electric Steel Foundry Co.
HONOLULU, HAWAII
Electric Steel Foundry Co.
HOUSTON, TEX.
Standard Brass & Mfg. Co.
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C. A. Roberts Company
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C. A. Roberts Company
KINGSPORT, TENN.
Slip-Not Belting Corp.
LAFAYETTE, LA.
Standard Brass & Mfg. Co.
LOS ANGELES, CALIF.
Electric Steel Foundry Co.
MILWAUKEE, WIS.
C. A. Roberts Company
NEW ORLEANS, LA.
Standard Brass & Mfg. Co.
NEW YORK, N. Y.
Schnitzer Alloy Products Co.
PHILADELPHIA, PA.
Horace T. Potts Company
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McJunkin Corporation
PORT ARTHUR, TEX.
Standard Brass & Mfg. Co.
PORTLAND, ORE.
Electric Steel Foundry Co.
ROCHESTER, N. Y.
Service Steel Division
Van Pelt Corporation
ROCKFORD, ILL.
C. A. Roberts Company
ST. LOUIS, MO.
C. A. Roberts Company
ST. PAUL, MINN.
C. A. Roberts Company
SALT LAKE CITY, UTAH
Electric Steel Foundry Co.
SAN FRANCISCO (Emeryville), CALIF.
Electric Steel Foundry Co.
SEATTLE, WASH.
Electric Steel Foundry Co.
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*Sanitary Tubing Only

Get in touch with your nearest Carpenter Distributor for service and satisfaction on all your stainless tubing and pipe needs. Over 20 standard AISI analyses and specialty super corrosion-resistant grades are available in a wide range of sizes, gauges, finishes, shapes and forms.

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**Stainless Tubing & Pipe**

# MACHINING: Carbide Throw-away Cutting Tools

**How important is it to use the right tool for the right job? . . . One machine operaor increased the life of cutting tools 27-pct by merely switching the grade of carbide throw-away inserts used . . . Feed, depth of cut and speed remain unchanged on the job.**

How much is it worth to use the right tool for the right job? Ask engineers at Sanford-Day Iron Works, Inc., Knoxville, Tenn. They increased tool life 27 pct on a job by merely changing the grade of carbide throw-away inserts used.

### Firm Machines Axle Shafts

Without altering feed, speed or depth of cut, the firm realizes this saving in machining 3-in. diam mine car axle shafts of SAE 1045 steel, as rolled.

Triangular "turn-over" inserts were used both before and after the change, each with six "indexable" cutting edges. The change was made from Kennametal grade K5H to K7H.

Now 168 axles are turned with each K7H insert; 28 per cutting edge. This represents about 37.5 miles of lineal cutting without any tool regrinding, the cut being made on a total length of 24 in. on the 3-in. diam shaft. An American Pacemaker, equipped with a hydraulic duplicator, does the job, running at 650 rpm, 515 sfpm with a feed of 0.016 ipr and 0.050-in. depth of cut. With a K5H insert, only 132 axles were turned.

Kennametal Inc., Latrobe, Pa., makes the inserts.

**Tool's life increased 27-pct in machining 3-in. diam pieces.**

### WANT MORE DATA?

***You may secure additional information on any item briefed in this section by using the reply card on page 81. Just indicate the page on which it appears. Be sure to note exactly the information wanted.***

*with* INDEPENDENT
*Gas Supply TRAILERS*

**TRANSPORTING** — Argon — Carbon Dioxide — Helium — Nitrogen — Oxygen — Boron Trifluroide — Hydrogen — Ethylene. Trailer capacities from 187,000 cu. in. to 750,000 cu. in. water capacity. Trailer tubes ICC3A-2400 Specifications with 2400 PSIG Working Pressure.

Sizes and weights to meet all State requirements.

Can be mounted on bases for permanent storage.

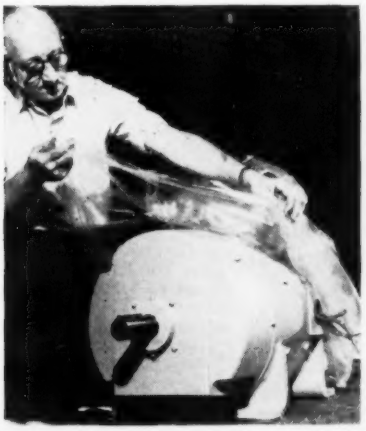
INDEPENDENT ENGINEERING CO., Inc.
CONSULTING · RESEARCH · DESIGNING
O'FALLON 4, ILLINOIS


## Handling:

**Motors, like carrots, stay fresh in plastic bags.**

If sack-size transparent plastic bags keep vegetables fresh for housewives, why can't they keep electrical equipment fresh, too. That's the question several manufacturers asked themselves. The answer: polyethylene bags for transformers, motors, etc.

Customers of General Electric's dc motor and generator department now receive factory fresh motors



**Polyethylene "supermarket" bags now protect dc motors.**

in polyethylene packages. Users say the bags keep motors clean and dry. Moreover, they like the ability to read the nameplate and attached instruction sheet without removing the protective cover.

## Fabricating:

### Method saves hours of pattern making time.

Due to the ingenuity of two employees, Lockheed Aircraft Corp. now uses a method of forming beads for plaster patterns to cast drop hammer dies.

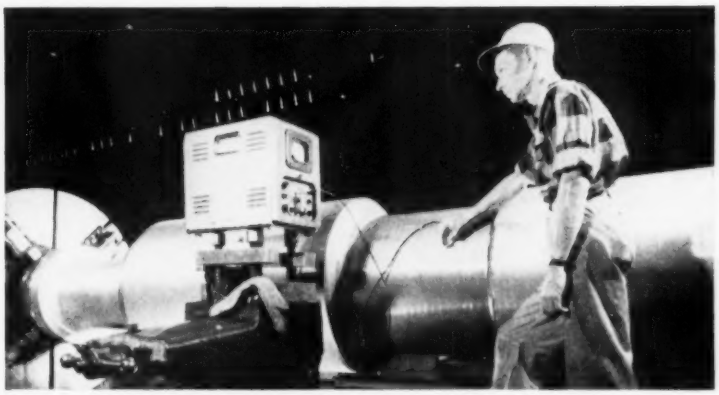
The new technique saves seven hours in manufacturing each pattern at the company's Marietta, Ga. plant.

Under the old method, the bead form was made of plaster from a metal template, a time and money consuming process.

After experimenting with several types of materials, an employee finally found a resilient plastic that can be shaped to any desired contour. This makes the bead form in minutes, instead of hours. Another employee's idea enables him to nail a plastic bead to the form in a few minutes.

The new method, using either plastic or discarded rubber air hose, can be followed a number of times after the first die has been cast.


# HOW ULTRASONIC TESTING HELPS U. S. STEEL PRODUCE FLAWLESS FORGINGS!



**This turbine generator shaft**—forged and sonic-tested by U. S. Steel – is part of the first nuclear reactor power plant to be built in the United States. The 60,000 kilowatt power plant will go into operation in 1957.

Here, the shaft is being Reflectoscope-tested while it is still in the lathe. The forging will be sonic-tested a *minimum of 5 times* as it progresses through various stages of manufacturing. At U. S. Steel, turbine and generator rotor forgings are tested at these stages:

1. Preliminary sonic test is run on the rough forgings before machining.
2. Forging is rough-turned to bring it into a "round," then sonic-tested again.
3. After a bore has been drilled through the forging, it gets a full-scale sonic inspection.
4. After grain-refining (heat-treatment) another sonic test is made.
5. After finish-machining and stress-relieving, the forging is inspected again as specified by the customer.

**All these sonic inspections** are usually conducted while the forging is rotating, except for the as-forged test. A carbide tool finish is used to provide a suitable surface for the double-crystal search unit.

This testing for defects before forgings are placed in actual operation enables U. S. Steel to turn out flawless forgings that *exactly* meet ASTM and customer requirements. Reflectoscope inspection saves U. S. Steel man-hours and money...helps assure customer satisfaction! It can do as much for you.

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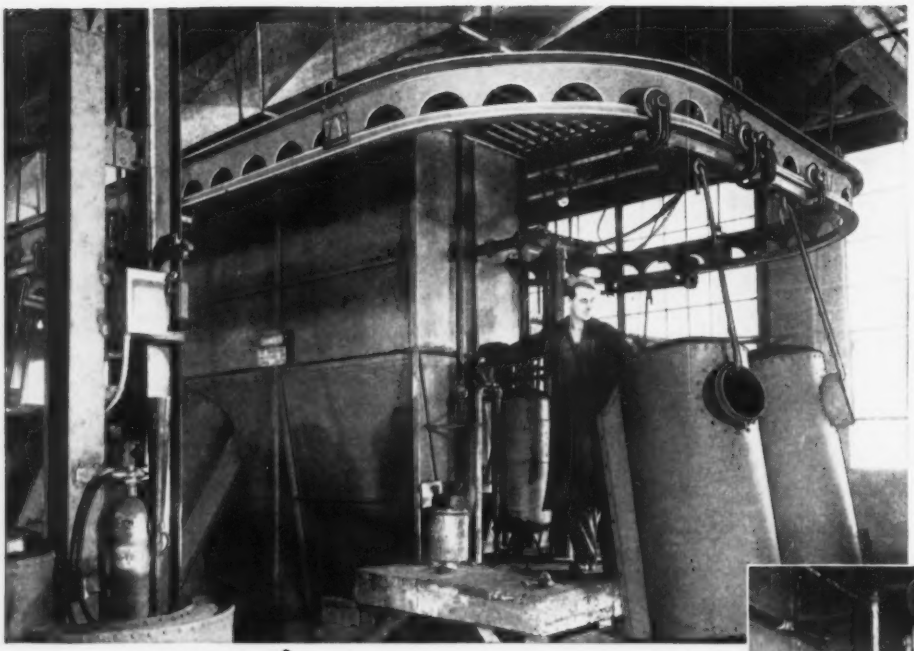


One man transfers furnace bodies, weighing 200 lbs., coming from welding booths to Tramrail track by means of a lift platform. Usually when he advances one carrier to spray booth, all 16 carriers must be moved at same time.

The curved track section is necessary to bring the furnace bodies near the water screen during spray painting so that paint in atmosphere will be removed properly. All points of a body are easily reached when supported overhead and the work is extremely fast.

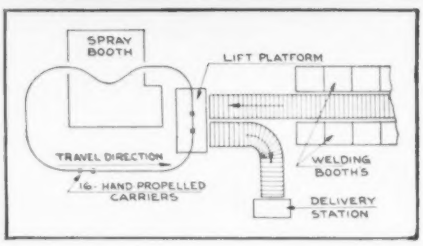
# *Easy Push* Moves 16 Carriers on Spray Booth Loop

CAN one man push 16 loaded four-wheel carriers (with 64 wheels in all) around an enclosed Tramrail track loop having six left-hand and two right-hand curves?

That question bothered the Armstrong Furnace Co., Columbus, Ohio, one of the world's largest furnace manufacturers, when they were developing their paint-spray systems for painting furnace bodies. There was considerable fear that friction and binding of so many carriers would create too great a load for one man to push hundreds of times during a normal working day.

They now have two such systems in operation. One man easily moves the carriers even when all are loaded. Little effort is required because of ball-bearing wheels and hard smooth flat treads on both wheels and track and easy swiveling yokes.

The systems are extremely efficient, requiring only two men each. 300 furnace bodies can be painted with each, in an eight-hour period.



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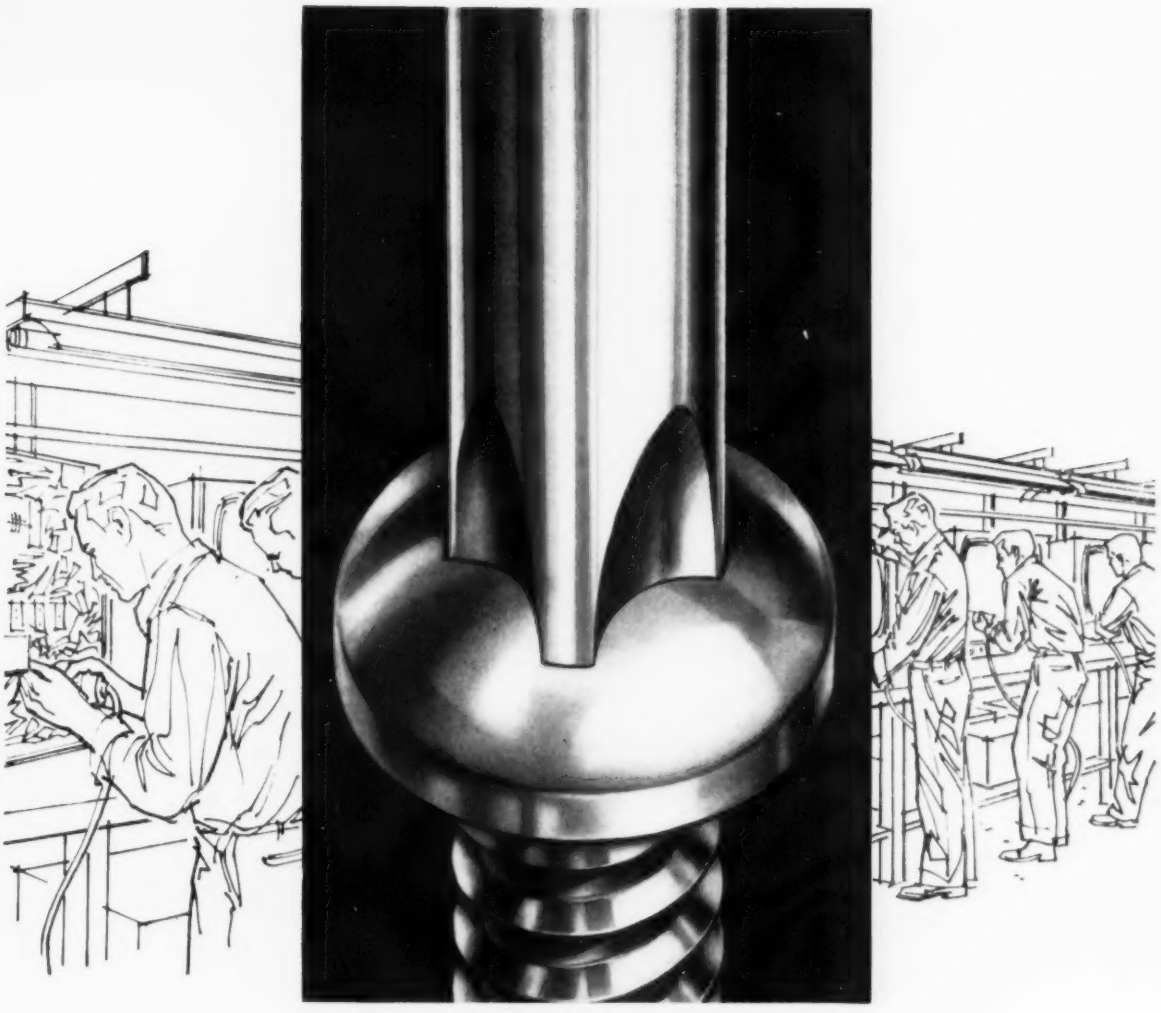
THE CLEVELAND CRANE & ENGINEERING CO.
4862 East 284th Street, Wickliffe, Ohio

**CLEVELAND TRAMRAIL**
**OVERHEAD MATERIALS HANDLING EQUIPMENT**



# *They may seem the same but...*

# AMERICAN is the name!

Your actual fastening costs are determined by four factors:

**1. Price 2. Service 3. Quality 4. Research**

In some instances, local price differentials may seem worthwhile, but no one gives you more of all four than American.

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**In Service** — where American is continually proving its ability to meet any reasonable delivery requirement regardless of geographical location.

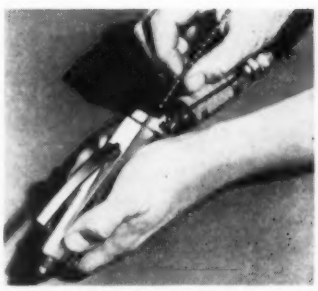
**In Quality** — where production tools made to precision specifications far exceed standard requirements.

**In Research** — where American engineers have not only developed the universally accepted Phillips Head Fastener but have produced such exclusive products as SCREWSTICK for industries with unique fastening problems. SCREWSTICK replaces the tedious handling of individual screws with automatic power driving, resulting in cost savings exceeding 4 to 1.

You can utilize these same facilities to speed production, increase quality and lower costs, because no one gives you more of all four factors; *price*, *service*, *quality* and *research* than American.

Decide for yourself. Send us your inquiry for price and delivery or your specifications for special fasteners. Write:

**American!**

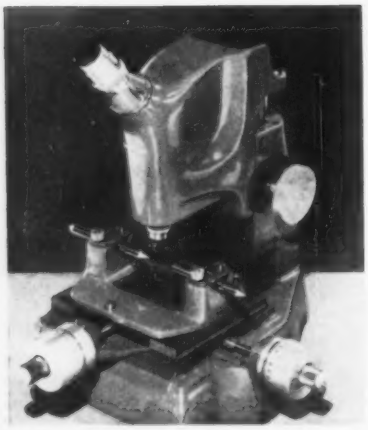


SCREWSTICK being loaded into air-powered driver

**AMERICAN SCREW COMPANY**
Willimantic, Connecticut
Norristown, Pa. • Chicago, Ill.
Detroit, Michigan

# NEW EQUIPMENT

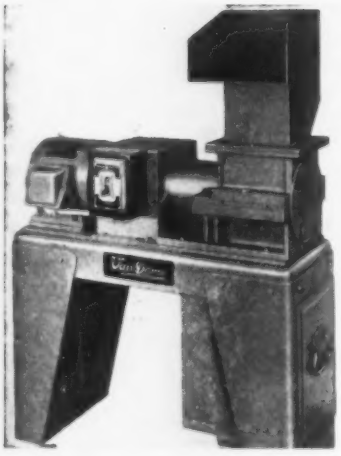
**New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 81 or 82.**



## Microscope measures tools, templates, finished parts

Equipped with a built-in light source, this toolmaker's microscope allows inspection and measurement of tools, drill jigs, templates and finished parts. It directs a light beam downward through the microscope's objective. This provides true vertical illumination. A collective mirror under its stage plate reflects the light back into the body tube. As a result, both the surface and contour of parts may be viewed simultaneously. Designed for precision measurement in two coordinates, the cross slide stage has a maximum possible range of 2-in. in the "east-west" direction and 1-in. in the "north-south" direction. The stage itself rests on ball bearings; two micrometer screws control its motion. Standard magnification is 35x. However, different objective and eyepiece combinations may be used to obtain other magnifications. A 7/5x protractor eyepiece, and centers which can be aligned with the eyepiece cross-hair are also available. *Bausch & Lomb Optical Co.*

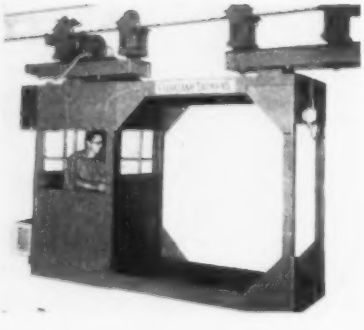
**For more data circle No. 30 on postcard, p. 81**



## Scrap granulator utilizes alloy steel grinding knives

Alloy steel knives in this plastic scrap granulator grind all thermoplastics including vinyl and polyethylene without fluffing. Hot and cold sprues can be fed together. To facilitate cleaning, the hopper chute is hinged; the entire hopper can be removed in a few seconds. The end plate is also hinged so that the screen can be readily taken out. To withstand continuous use, the model is of welded, all-steel construction. Its one-piece alloy steel rotor is ball bearing mounted. This is directly coupled to the heavy duty motor. Compact design permits use of the grinder beside-the-press or on batch work. The hopper's design prevents fly-back. In addition, the hopper is located at easy-to-feed heights. The unit has up to 250-lb per hour capacity (depending on material and size of scrap), a hopper throat opening of $6\frac{1}{4}$ x 7-in. A $1\frac{1}{2}$-hp 1200-rpm 220-440v 3 phase 60 cycle motor powers it. The scrap granulator's dimensions are 33-in. long, 16-in. wide and 48-in. high. Weight: 475-lb. *The Van Dorn Iron Works Co.*

**For more data circle No. 31 on postcard, p. 81**



## Carrier transports hot metal on overhead tramway

Although designed especially for conveying ladles of hot metal used for diecasting, this carrier can be altered slightly for other operations. The overhead tramrail unit's platform may be changed in size and adapted for many materials handling purposes. The carrier illustrated has a cab which is enclosed with aluminum paneling. Air conditioning keeps the operator comfortable while transporting the molten metal. The door has a safety switch that prevents the carrier from being moved when the door is open. It has a capacity of 3100-lb and travels at speeds to 300-fpm. Carriers also come in many other capacities and speeds. *Tramrail Div., Cleveland Crane & Engineering Co.*

**For more data circle No. 32 on postcard, p. 81**

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Every warehouse and branch office in Crucible's growing countrywide chain is geared to fill your special steel orders *quickly* . . . efficiently, too . . . no matter how large or small they are.

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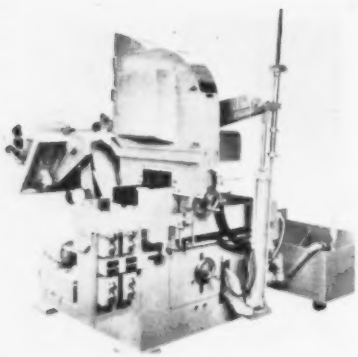
## Electro magnetic drill press uses automatic power feed

This electro magnetic drill press is now equipped with automatic power feed. While the electro magnetic base holds the drill in position, the power feed makes it possible for the operator to run the drill point down to the center punch mark. He turns on the automatic feed and the drill does all the work. Power feed can be engaged or disengaged at any time during the drilling operation. Depth of cut per revolution can be set according to the size of the drill bit being used. Completely portable, the drill press can be taken to the job. This eliminates production tie-ups and wasted time involved when taking the work to a radial drill. In continuous drilling operations the drill press will handle a high rate of production. It drills up to 1¼-in. and taps 1-in. holes with accuracy. Elimination of any pushing or effort on the operator's part is said to completely eliminate fatigue. *Portomag, Inc.*

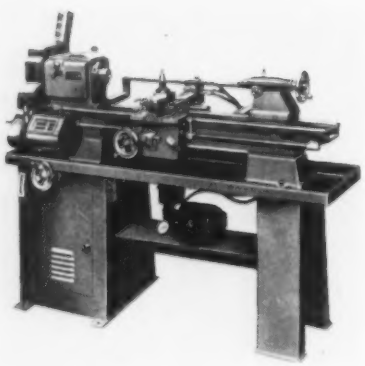
**For more data circle No. 33 on postcard, p. 81**



## Rugged machine cuts practically any metal

Large diameter bar stock, tubing and other shapes can be cut with this rugged unit. It handles ferrous and nonferrous metals, including corrosion-resistant, hardened and annealed steels. Equipped with a 26-in. diam abrasive cutting wheel, its capacity is 8-in. square solids. It is an oscillating type machine. The wheel feed and work clamps operate hydraulically; work bar feeds by hand. The oscillating motion reduces abrasive wheel contact. Very little wheel pressure performs the cutting. The unit's main bed or pedestal is fabricated of heavily ribbed and welded steel. It has a self-draining coolant collector. Its spindle, of forged alloy steel, is heat-treated, precision ground and dynamically balanced. It mounts in a separate housing. This adjusts for accurate alignment. *Campbell Machine Div., American Chain & Cable Co., Inc.*

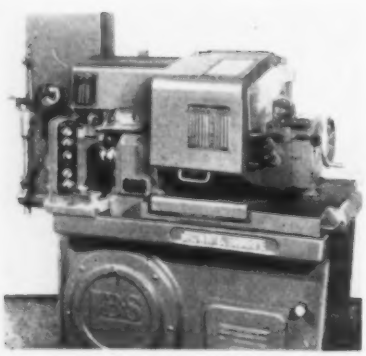
**For more data circle No. 34 on postcard, p. 81**



## Tracer lathe automatically reproduces many dimensions

This 12-in. hydraulic tracer lathe provides automatic reproduction of multiple diameters, tapers, bevels, shoulders, radii, grooves and chamfers. It duplicates these quickly, and to the same accuracy as the template. A hydraulic cylinder housed in a servo motor on the lathe cross slide provides power to feed and hold the cutting tool. The motor, pump, reservoir and pressure gage are located beneath the chip pan. The template mounting bar takes templates made of ⅛ to ¼-in., flat stock. Lathe bed ways are flame hardened and precision ground. Drive is variable speed. This makes instantly available any spindle speed from 43 to 222 and 250 to 1300-rpm without stopping the lathe or shifting belts. The motor is 1½-hp. *Clausing Div., Atlas Press Co.*

**For more data circle No. 35 on postcard, p. 81**



## Units cut without reversing spindle

Two new automatic screw machines are for frequent jobs advantageously performed without the necessity of reversing the machine spindle. Both machines have a spindle speed of 10,000-RPM, realizing increased efficiency on free-machining materials with a wide range of low speeds for efficient operation on the tougher alloys. One type has a turret and vertical slide. It is identical with an automatic screw machine except for the non-reversing spindle. It is designed for drilling, reaming, facing, turning, forming, knurling, cutting-off, etc. The second type omits the vertical slide. The turret is replaced by a one-tool position slide. It handles all types of form and cut-off work. Both machines are of full ½-in. capacity. *Brown & Sharpe Mfg. Co.*

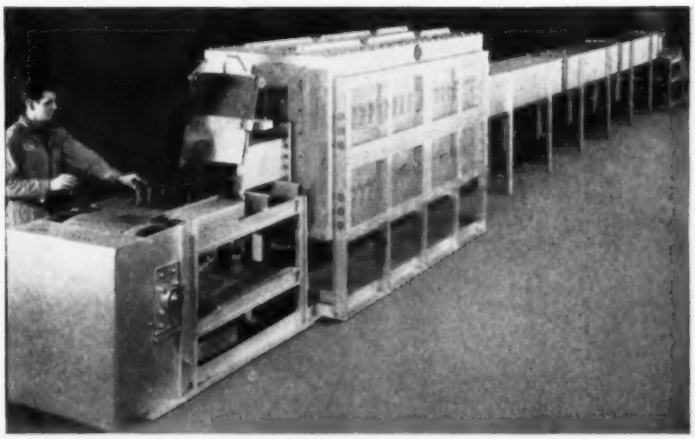
**For more data circle No. 36 on postcard, p. 81**

# SELECTION GUIDE FOR BRAZING FURNACES

## Check These Standard HARPER Controlled-Atmosphere Brazing Furnaces Against Your Requirements

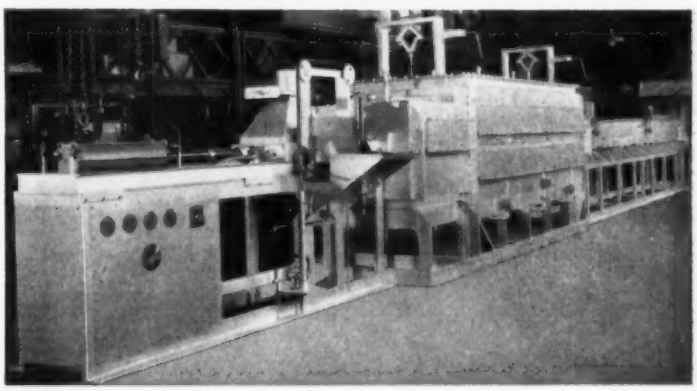
☐ **CONTINUOUS MESH BELT FURNACE**

The perfect production furnace for brazing versatility. Provides adjustable speed automatic conveyance, precluding need for special fixtures, trays, etc. Ideal for silver or copper brazing of short runs on different shapes. Belt loading up to 10 pounds per square foot at 2100°F., larger loads permitted at lower temperatures. Belt widths to 24", charge heights to 12"; production capacities to 550 lbs/hr. Completely automatic operation available.



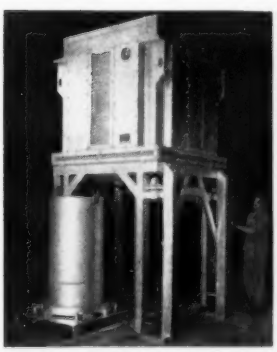
☐ **CONTINUOUS PUSHER FURNACE**

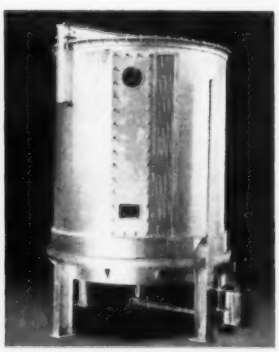
The mechanical pusher furnace is designed for heavier loading (up to 100 pounds per square foot) and is therefore most suitable for large-production silver or copper brazing runs of heavier assemblies. Trays or special fixtures often used. Provides accurate atmosphere control. Pilot plant or small production units available for manual pusher operation. Standard hot zone sizes up to 18" x 9"; production capacities to 1000 lbs/hr.



☐ **ELEVATOR FURNACE**

The best batch brazing furnace where maximum heat uniformity is important. Hearth is rolled away from furnace for easy loading, is repositioned under furnace, then raised into heating chamber. Ideal for large and/or heavy loads which must remain free of vibration during brazing. Adaptable to stainless steel brazing when muffle is used. Rapid cooling obtainable by removing work from furnace chamber. Available chamber sizes up to 150 cu. ft.





☐ **BELL FURNACE**

The bell furnace is similar to the elevator except that the assemblies to be brazed may be stationary throughout the cycle. The load is placed on a fixed hearth and the furnace bell lowered over it. Generally available with nickel alloy heating elements for temperatures up to 2050°F. Special designs may incorporate silicon carbide for higher temperatures. Ideal for stainless work with muffle.

**If you want more information on these or other Harper Furnaces, just check the coupon or visit Harper Booth 724 at the Cleveland Metal Show.**

# HARPER
## ELECTRIC FURNACES

**FOR**

**CONTINUOUS BRAZING, SINTERING, WIRE ANNEALING, BRIGHT ANNEALING, ANNEALING, FORGING and RESEARCH**

HARPER ELECTRIC FURNACE CORP.
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☐ Mesh Belt ☐ Elevator ☐ Pusher ☐ Bell

☐ Other .....

Name .....

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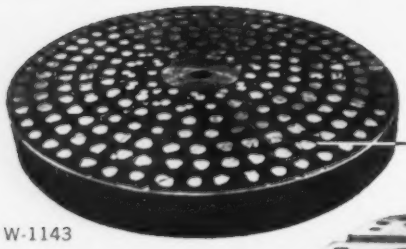
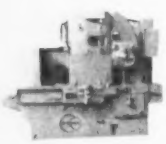


W-1143

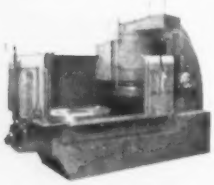
## tiny or **tremendous...**

W-1145

# For best results...***PUT IT ON A BLANCHARD!***



Blanchard No. 18



Blanchard No. 42-84

There's a Blanchard for every surface grinding job, in a broad range of sizes. For example, the Blanchard No. 18 grinds non-magnetic transistor elements (upper left) .006" thick, to a tolerance of .0005" with good finish. This job, which involved .006" to .008" stock removal per side, was held on special fixture plates.

At the other end of the scale, a huge Blanchard No. 42-84 Grinder grinds a turbine housing (upper right) which measures 83" across the corners, and is 28" high. This housing, ground after rough machining, required .020" stock removal. Both this piece and its mating part were ground to a steam-tight joint.

Whatever *you're* grinding—be it tiny watch parts, giant steel plates, or anything in between—there's a Blanchard designed to do the job speedily and accurately.

Ask for details on the 15 standard Blanchard models.

***PUT IT ON THE*** **BLANCHARD**

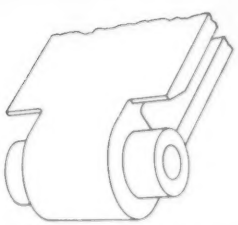
*Send for free copies of "Work done on the Blanchard", fourth edition, and "The Art of Blanchard Surface Grinding".*

**THE BLANCHARD MACHINE COMPANY** 64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

# TIGHTEN YOUR BELT ON COSTS!

## SPECIFY HEAVY-DUTY THERMALLOY* CONVEYOR BELT

Designed by Electro-Alloys to eliminate the "crank-shafting" caused by extreme temperatures and heavy loading conditions. Short integral cast pin allows the link to adjust itself and transfer the load of the belt evenly to the rest of the links. Cast pin is approximately twice as strong in shear as the ordinary wrought alloy bar—and so designed that the bending stress is definitely lower than can be expected from the cast link of a conventional belt.

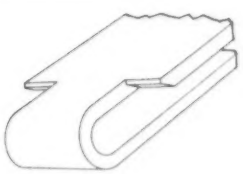


Typical heavy-duty link with cast pin.

## FOR LIGHTER PARTS, SPECIFY THERMALLOY GENERAL PURPOSE

A loop-type casting design, suitable for general heat-treat applications in industry. Available in either 3″ or 4″ pitch. The 3″ pitch is a light-duty general-purpose belt, weighing 17 lbs. per sq. ft. The 4″ pitch is primarily designed for intermediate loads of somewhat larger parts, and weighs 21 lbs. per sq. ft.

*Reg. U. S. Pat. Off.



Typical 3″ or 4″ pitch center link of loop-type casting design.

WRITE FOR BULLETIN T-241

. . . giving additional design and application information on both Heavy-Duty and General-Purpose Thermalloy Conveyor Belts. Address: Electro-Alloys Division, 8011-A Taylor St., Elyria, Ohio.

AMERICAN Brake Shoe COMPANY **ELECTRO-ALLOYS DIVISION** ELYRIA, OHIO

## Fork extensions fit low-lift, pallet-type electric trucks

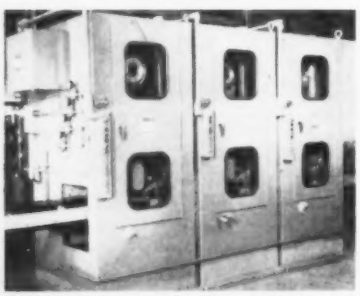
Fork extensions for use with one manufacturer's line of low-lift, pallet-type, electrically-powered trucks make possible easy handling in special situations. The attachments easily slip onto any standard forks. This immediately doubles the length of the forks. With the extensions, pallet trucks are able to handle long, light, bulky loads on either skid platforms or open face pallets. Rugged and durable, the fork extension attachments are of all-steel construction. Each is reinforced throughout for added life. The attachments were initially designed by the manufacturer for an electric manufacturing concern with a special materials handling problem. They are now available in a wide range of sizes and are adaptable to any pallet type truck. *Lewis-Shepard Products, Inc.*

For more data circle No. 37 on postcard, p. 81

## Heavy duty fork trucks feature 7000 & 8000-lb capacities

Two new fork trucks feature capacities of 7000 and 8000-lb. They have simplified hoisting mechanisms. A motor-driven, low-pressure vane pump actuates a single-acting hydraulic cylinder. They feature a "balanced suspension" system, eliminating destructive side forces when handling off-center loads. Specially dimensioned and machined channels strengthen the hoist setup and allow use of narrow trade members and small rollers. An eccentric adjustment on the roller takes up any play from wear on the channel or rollers. *Mercury Mfg. Co.*

For more data circle No. 38 on postcard, p. 81



## Grinder-polisher allows three-step stock removal

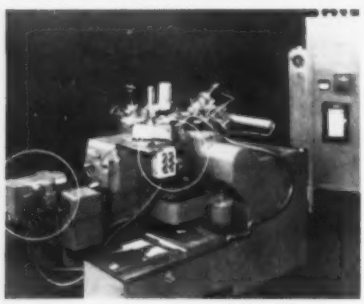
Coated abrasive belts are the cutting tools on a new line of grinding, polishing and deburring machines. This unit has three abrasive belts over one conveyor belt. It features wet grinding, oil mist application, automatic tracking and pneumatic tensioning of the 10-in. wide abrasive belt. A three grit polishing sequence is possible with it. Also possible: a three step stock removal for sizing, or combinations of polishing and grinding. The neoprene rubber conveyor belt allows for relatively close tolerance work. One user reports holding part tolerances of ±0.001-in. *Curtis Machine Div., The Carborundum Co.*

For more data circle No. 39 on postcard, p. 81

## Segmented transfer machine loosens and tightens bolts

An in-line segmented transfer machine bores and taps automotive differential carrier and cap assemblies. It performs bolt loosening and tightening operations to relieve stresses between rough and semi-finish boring. The seven-station, hydraulically-operated machine rough bores two carrier bearing holes, loosens and tightens four bearing cap bolts, semi-finish bores the two bearing surfaces and taps each bearing at a net rate of 180 pieces per hour. Parts are transferred in pairs from station to station on rails. *Snyder Tool & Engineering Co.*

For more data circle No. 40 on postcard, p. 81



## Electronic gage system automatically feeds grinders

This electronic gage and feed system through-feeds centerless grinders. It uses the feedback principle while gaging the parts being ground, adjusts to compensate for wheel wear, and records the size, all automatically. The unit continuously gages finished work as it emerges from the machine; the data is fed back to the machine. This automatically adjusts for wear and all other variables that affect size changes. One operator can run several machines with it. It virtually eliminates manual gaging. Machines can run as much as 40-pct faster with it. Scrap loss is restricted to set-up pieces. *The Kaydon Engineering Co.*

For more data circle No. 41 on postcard, p. 81

## Safe stopper head

A new safe stopper head for huge ladles reduces pouring accidents in steel mills and prevents spillage. The stopper head regulates the molten steel flow as many as 50 times during a single head without cracking from heat shock or "spalling." Stopper failure, of course, could mean an uncontrolled flood of molten metal to engulf steel workers. Steel loss in such a case would be serious, too. In some cases this might be 250-tons. The new stopper is made from flake graphite, fused silica and fired refractory clay. For operating temperatures above the normal 2900°F, aluminum oxide is added to the mixture. *Electro Refractories & Abrasives Corp.*

**For more data circle No. 42 on postcard, p. 81**

## Dredge bucket

This dredge bucket, designed to withstand abrasion and shock, is now in use as part of the operations of Olympian Dredging Co. of San Francisco. The 10-ton giant clamshell stands 17 ft high when closed, has an open, or bite diameter of 12½ ft, and a capacity of

7½ yd. To meet requirements for an abrasion, corrosible and shock resistant steel, it contains Mayari-R, a high strength corrosion resisting steel. The dredge bucket was fabricated from 1½ and 2-in. plate. Greater strength was insured by hard-facing all wearing parts. *Bethlehem Pacific Coast Steel Corp.*

**For more data circle No. 43 on postcard, p. 81**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# U.S.I. CHEMICAL NEWS

A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries

## *Greenleaf to Handle Market Development of Zirconium And Titanium for U.S.I.*

William C. Greenleaf has been named Manager of Metals Development for U.S.I. and will be responsible for market development and sales of zirconium and titanium sponge, to be produced from U.S.I.'s two new plants now being built in Ashtabula, Ohio.

A recognized authority in the field of zirconium and titanium, Mr. Greenleaf presented three papers during the 1955 Atomic Industrial Forum Zirconium Program, describing (1) melting of zirconium, (2) fabrication of zirconium, and (3) zirconium mill products and prices. He also conceived and developed processes now in general use for producing both wide-sheet and flat-bar titanium and zirconium by continuous strip-mill techniques.

## Faye Named Manager of Sodium Product Sales

Martin Faye has been named Manager of Sodium Product Sales for U.S.I. and will be responsible for coordinating sales and sales promotional activities for metallic sodium, "U.S.I. Isosebacic" acid and related products.

Mr. Faye joined the U.S.I.-National Distillers organization in 1952 in the Market Research and Development Department.

### TECHNICAL DEVELOPMENTS

*Information about manufacturers of these items may be obtained by writing the Editor, U.S.I. Chemical News.*

**A zirconium-copper alloy** now available is reported to combine high electrical conductivity with good strength retention at elevated temperatures. Suggested for electrical motor commutators serving above 500°F where strength is needed. Conductivity is 95.8% of copper. **No.1193**

**Titanium wire cloth** is now on the market in sizes from 60 mesh to coarser grades. It is reported to be particularly suitable for filtering or screening highly corrosive materials. **No. 1197**

# Zirconium and Titanium Lick Roughest Corrosion Problems

### Metals to be Available at Lower Cost in Future; Provide Long-Lived Materials of Construction; Complement Each Other on Corrosion Resistance

It is now practical to fabricate equipment which is *corrosion-resistant to almost every substance encountered in industry*, by using either zirconium or titanium metal. Alloys of either metal, or possibly both, may extend the range even further.

Industrial applications of these metals have been hampered by two considerations: availability and price. Zirconium will shortly be produced at a rate sufficient to supply industrial needs, and titanium has been available to industry during the past two years. And it is expected that increased production of these metals during the next few years will result in significant price decreases.

Twelve to thirteen thousand tons of titanium were available in 1956 and present construction schedules indicate that the figure will rise substantially in 1957. U.S.I.'s new plant alone will add 5,000 tons to the annual production capacity by the end of the year. Zirconium will be on the market in quantity by mid-1957. When its new plant at Ashtabula, Ohio gets under way, U.S.I. will be able to supply 500,000 pounds or more per year to commercial users in addition to its Atomic Energy Commission commitments of 1,000,000 pounds per year.

#### New Metals Economical

Chemical process equipment can now be fabricated from titanium for a little over twice the price of stainless steel, and it is expected that in the future titanium equipment will be only 50-75% higher than stainless. Commercial grade zirconium equipment will probably be priced only 75-100% higher than stainless when volume production is reached.

### Typical Corrosion Resistances* of Zirconium and Titanium

| Corrosive Media | Metal Resistance | |
|---|---|---|
| | Zirconium | Titanium |
| Sulfuric Acid | excellent to good below 80% | good below 5% |
| Nitric Acid | excellent | excellent |
| Hydrochloric Acid | excellent | good below 10% |
| Phosphoric Acid | excellent to fair below 85% | poor |
| Chromic Acid | excellent | excellent to good |
| Aqua Regia | poor | excellent |
| Wet Chlorine Gas | poor | excellent |
| Chlorine Water | excellent | excellent |
| Sodium Hydroxide | good below 90% | good below 50% |
| Ferric Chloride | poor | excellent |
| Calcium Chloride | excellent | excellent |
| Cupric Chloride | poor | excellent |
| Sodium Chloride | excellent | excellent |
| Ammonium Chloride | excellent | excellent |
| Aluminum Chloride | excellent | excellent to fair |

*Above data do not cover all conditions because of space limitations. Literature references may be obtained by writing the Editor, U.S.I. Chemical News, 99 Park Ave., N. Y. 16, N. Y.

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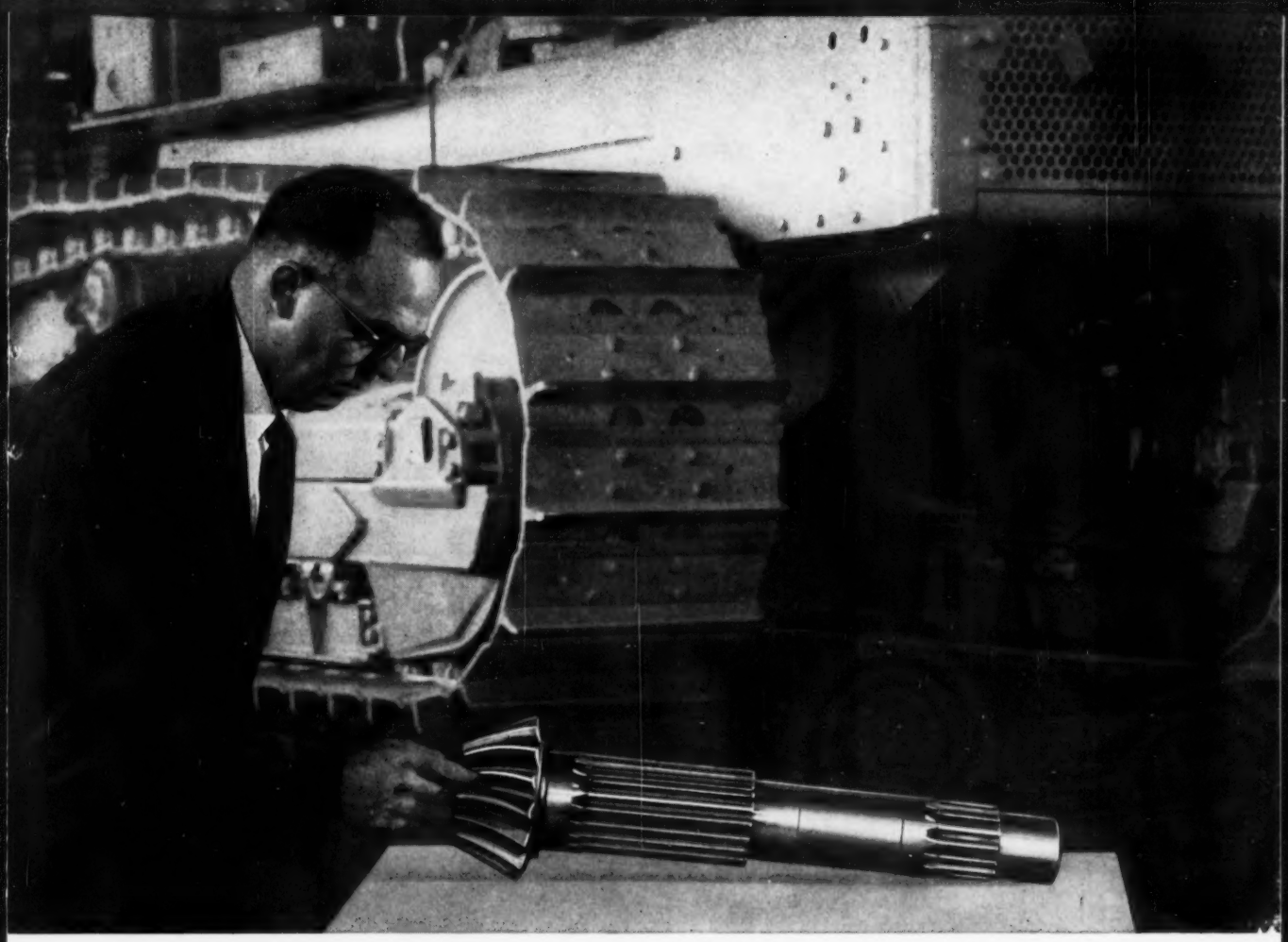


Caterpillar Tractor Co. Metallurgist T. H. Spencer inspects final drive pinion for D9 crawler tractor weighing 28 tons. Severe loading of this large pinion requires a steel with high case and core hardenability. Several years ago Caterpillar Tractor Co. found that simply by increasing the molybdenum content of AISI 8622 (to 0.30-0.40%), the desired properties were obtained at lower cost than was possible in any of the standard carburizing grades.

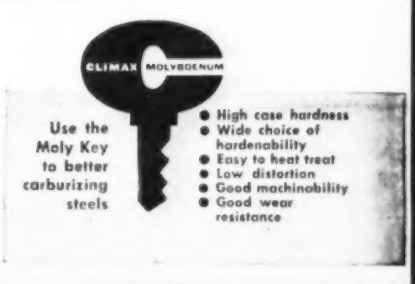
# Caterpillar Tractor Co. improves case and core hardenability of carburizing steel by increasing molybdenum content

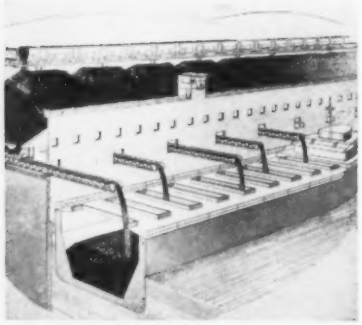
**"Drive pinions in tractors must take very high torque loads," says T. H. Spencer, Metallurgist for Caterpillar Tractor Co. "AISI 8622 steel, which we had been using, couldn't give us the hard case and strong, tough core we needed in these heavy sections. Other standard carburizing steels with the requisite properties would have cost substantially more. We found, however, that we could achieve the desired surface and core properties by simply modifying AISI 8622 with a higher percentage of molybdenum. We have been using this composition for several years, and results have been excellent."**

Caterpillar Tractor Co.'s experience shows how increasing molybdenum in a carburizing steel helped to solve a specific problem. Perhaps your product, too, can benefit by higher molybdenum content.

A technical article, "New Carburizing Steels for Critical Gearing", describes some recent investigations of higher-moly carburizing steels. For a reprint, write Climax Molybdenum Company, Dept. 2, 500 Fifth Avenue, New York 36, N. Y.

**CLIMAX MOLYBDENUM**





## Belt conveyor loads 10 hatches at once

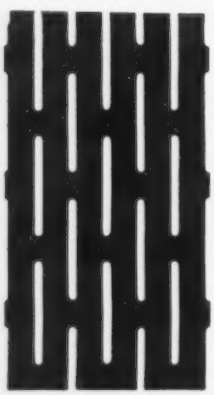
This new system of 25 shuttle belt conveyors will load ore vessels with taconite pellets at Erie Mining Company's Taconite Harbor, Minn., port facility on Lake Superior when it begins operation. The belt conveyor system loads as many as 10 alternate hatches simultaneously. This is a departure from the conventional method of loading ore vessels by chutes. Two vessels can be loaded simultaneously; the complete system of shuttle belt for each vessel is operated from a central control tower. Pellets arrive at the dock in rail cars, are emptied into a storage bin and weighed as they are loaded into hatches. Each of the 25 shuttle belt conveyors on the 1200-ft long dock is capable of loading taconite pellets at the rate of 750 or 1500 long tons per hour at belt speeds of 250 or 500-fpm. *Link-Belt Co.*

For more data circle No. 44 on postcard, p. 81

## Impregnating system

A large impregnating system coats, with insulating varnish, armatures and field coils of diesel-electric locomotive traction motors. The impregnating chamber, is 58-in. ID and nearly 9-ft tall. It has a maximum immersion height of 87-in. This is deep enough to fully cover the longest armatures. The components to be impregnated are lowered into this chamber. The hinged lid is closed and sealed. Vacuum is then drawn within the chamber by pumping out virtually all of the air. Along with the air go the last traces of moisture that may have been clinging to the inner surfaces of the electrical windings. When all of the air and moisture have been sucked out, the impregnating liquor is admitted to the vacuum chamber by opening the valve in the pipe. This connects the chamber with a 1120-gal storage tank. The varnish rises in the impregnating chamber until it completely covers the motor components. Thanks to the absence of air, the varnish penetrates deeply into the windings. Air under pressure is then applied to the surface of the varnish "bath" to accelerate penetration. The armature or the coil is then removed from the vacuum chamber and the varnish is dried by baking it slowly for 16 to 18 hours at a temperature of 140 to 150°C. *F. J. Stokes Corp.*

For more data circle No. 45 on postcard, p. 81

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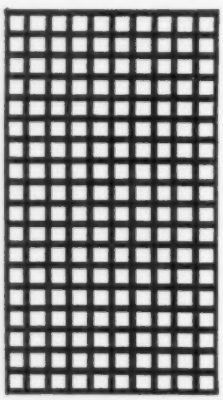

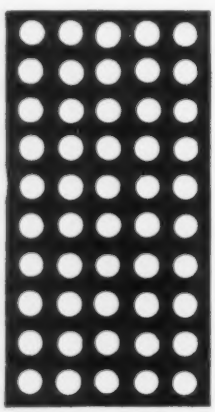

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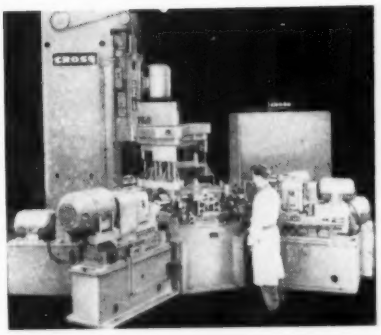
## Two machines process six different cylinder blocks

Two new dial type machines process six different air compressor cylinder blocks. They rough and semi-finish bore the cylinders, rough and finish counterbore the valve ports, and drill, chamfer and ream all other necessary holes. One machine has a four-station index table; the second, a six-station index table. Indexing is automatic and fully interlocked with the machine cycle. Both have two-position, progressive work holding fixtures with interchangeable adapters for the six different parts. Rated capacity of the duo is 129 cycles per hour at 100-pct efficiency. An outstanding feature: flexibility for part design changes, due to "building-block" construction. *The Cross Co.*

**For more data circle No. 46 on postcard, p. 81**



## Mandrel forging

A giant mandrel forging was produced recently for a steel scrap baling company. The cylinder is more than 16 ft long and 28½ in. in diameter except for the upset end which has a diameter of 33 in. It has a 6-in. wall and weighs 26,700 lb. This is one of two forged cylinders which will become scrap baler rams. A special mandrel was made to produce these forgings. *National Supply Co.*

**For more data circle No. 47 on postcard, p. 81**

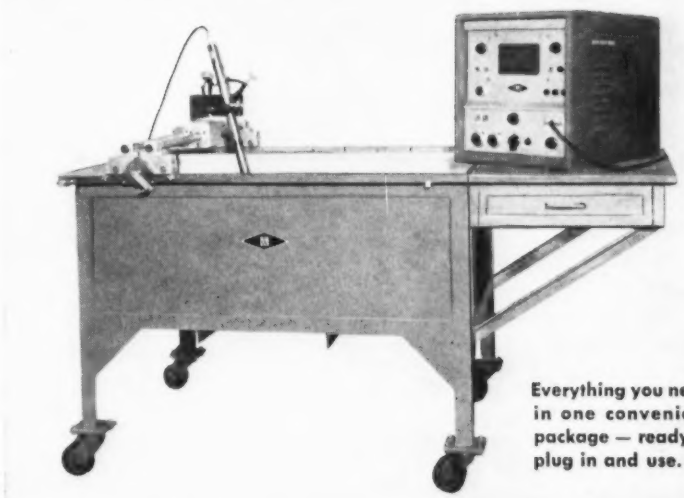
## Boring bars

Boring bars, manufactured from high quality tool steels, and forged bits of solid high speed steel are now available. All bars come with four flats and straight or angular square holes with off-the-shelf delivery on catalog standards. These

range from ½ to 1½-in. diam. Forged bits are also offered on an off-the-shelf delivery basis on standards and range in size from ⅜ to 1-in. diam shanks with boring capacity starting at ¼-in. In addition to the standard lines of comparatively low cost boring bars and forged bits, the manufacturer also offers facilities for making special boring bars. *Maxwell Industries, Inc.*

**For more data circle No. 48 on postcard, p. 81**


# ULTRASONIC INSPECTION



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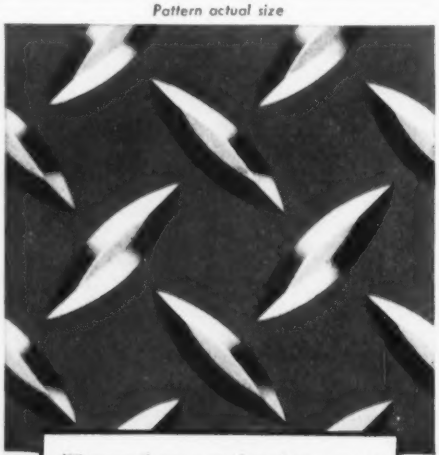

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# The Iron Age SUMMARY . . .

**Steel pessimists are becoming more optimistic . . . Market strong points offset letdowns in some areas . . . Easier second quarter predicted . . . Slipping scrap prices cited.**

**Horns In** . . . Some of the pessimists in steel are pulling in their horns a little this week. They're now protesting that the steel business is not so bad, after all.

This about-face, coupled with restrained optimism in important quarters, puts the steel outlook in a more encouraging light. The market's strong points are tending to offset its weaknesses, although no one is overlooking the soft spots.

Continued easier demand from Detroit portends a decline in steel operations in second quarter. But this may be offset somewhat by indications that automotive inventory cutbacks may be over by March. Detroit steel stocks are approaching the stage where further cuts might be dangerous.

Further declines in steel scrap prices could also be a harbinger of an easier second quarter in steel. Prices were off sharply again this week in important consuming areas. The mills apparently are gearing their scrap inventories to anticipated lower operating schedules.

**Not All Bad** . . . The soft tone of the cold-rolled sheet market is giving a break to users of light plates. Some mills are now accepting orders for light plate for rolling on sheet-strip mills. Normally, the producers are not interested in this type of business. Hot-rolled sheet users also are picking up extra tonnages.

But the shift in flat-rolled from a seller's to a buyer's market is giving little comfort to users of plate and structurals. If anything, the outlook for these two products is getting darker. More users are turning to costly gray market, conversion, and imports—if they can make deals of any kind. Mills are falling behind on delivery promises after washing out tonnages to start the New Year on a current basis.

**Farmer Back** . . . There's a growing feeling among steel producers that the Detroit inventory shakedown will be about over by March. No one is going overboard about the prospects for April. But the feeling is that while demand might not get better, the chances are good that it won't get any worse. April demand could be up, depending on the trend in new car sales.

Meanwhile, the farm market is showing signs of coming to life. Wire orders from farm areas picked up slightly in January—and the mills are cautiously optimistic.

## Steel Output, Operating Rates

| Production | This Week | Last Week | Month Ago | Year Ago |
|---|---|---|---|---|
| (Net tons, 000 omitted) | 2,496 | 2,484 | 2,388 | 2,308 |
| **Ingot Index** | | | | |
| (1947-1949=100) | 155.4 | 154.6 | 148.7 | 149.2 |
| **Operating Rates** | | | | |
| Chicago | 92.0 | 98.0* | 102.0 | 101.5 |
| Pittsburgh | 100.0 | 99.0* | 100.0 | 102.0 |
| Philadelphia | 104.5 | 103.0 | 102.0 | 101.0 |
| Valley | 98.0 | 97.0* | 99.5 | 98.0 |
| West | 99.0 | 99.0 | 100.0 | 97.0 |
| Buffalo | 105.0 | 105.0 | 105.0 | 105.0 |
| Cleveland | 94.5 | 94.5* | 96.0 | 103.0 |
| Detroit | 102.0 | 105.0 | 99.0 | 100.0 |
| S. Ohio River | 91.5 | 88.0* | 90.0 | 97.5 |
| South | 96.5 | 98.0 | 90.0 | 96.0 |
| Upper Ohio R. | 105.0 | 105.0* | 99.5 | 104.0 |
| St. Louis | 100.0 | 98.0 | 64.0 | 106.0 |
| Northeast | 31.0 | 31.0 | 99.0 | 85.0 |
| **Aggregate** | 97.5 | 97.0 | 97.0 | 99.5 |

*Revised

## Prices At A Glance

(cents per lb unless otherwise noted)

| | This Week | Week Ago | Month Ago | Year Ago |
|---|---|---|---|---|
| **Composite price** | | | | |
| Finished Steel, base | 5.622 | 5.622 | 5.622 | 5.174 |
| Pig Iron (Gross Ton) | $62.90 | $62.90 | $62.90 | $59.09 |
| Scrap, No. 1 hvy (gross ton) | $55.50 | $57.83 | $63.50 | $50.83 |
| **Nonferrous** | | | | |
| Aluminum ingot | 27.10 | 27.10 | 27.10 | 24.40 |
| Copper, electrolytic | 36.00 | 36.00 | 36.00 | 43.00 |
| Lead, St. Louis | 15.80 | 15.80 | 15.80 | 15.80 |
| Magnesium ingot | 36.00 | 36.00 | 36.00 | 33.25 |
| Nickel, electrolytic | 74.00 | 74.00 | 64.50 | 64.50 |
| Tin, Straits, N. Y. | 102.50 | 101.75 | 101.00 | 102.00 |
| Zinc, E. St. Louis | 13.50 | 13.50 | 13.50 | 13.50 |

*Revised

STEEL PRODUCT MARKETS

# Warehouse Prices Up 3.4 Pct

**Boosts are in response to recent mill increases . . . Won't hold if there's hike in producers' bases . . . Light plate users benefit from slackness in sheet and strip.**

◆ WAREHOUSE price increases are averaging 3.4 pct with some product advances ranging up to 5.5 pct. Hot and cold-rolled sheet —moving up 3.5 pct—represents the average boost.

Since the raises are not felt to increase warehouse profit margins, mill base price advances will probably mean yet another warehouse advance.

"Any increase at mill level either in extras or base price increases," says C. L. Hardy, president, Jos. T. Ryerson & Son, Inc., "means a warehouse cost increase. By the same token, further labor cost increases at the mill level will boost warehouse costs.

"Any further cost increases will have to be reflected in further cost increases at the warehouse, despite the competitive market in some grades of steel. Cold-rolled sheet, for instance, is particularly competitive, and the warehouse price increase represents just about exactly the amount of the mill increase. Warehouses are using restraint, but price levels must advance with the mill price increases that are expected in the future."

In addition to Ryerson other warehouses advancing prices are U. S. Steel Supply, Atlantic Steel Co. and O'Neal Steel, Inc. (See p. 117.)

In some cases the new prices show an attempt to offset higher freight rates. At St. Louis, for example, there's a price spread of 60¢ a ton on both hot and cold finished merchant bar. The high side of the spread represents increased freight charges to the warehouse.

SHEET AND STRIP . . . Proving it's an ill wind that blows nobody good, the slackness in the sheet and strip market is benefiting plate users. Customers are getting more light plate rolled by some mills on sheet and strip equipment. Producers in one area are allowing buyers to take some light plate as part of their h-r sheet allotments.

The flat-rolled market is still lethargic as some mills report they have c-r sheet tonnage available for March delivery. A **Cleveland** area producer, specializing in automotive orders, is running at half speed. There's been a general reduction in the level of h-r sheet activity, too.

**Detroit** mills say demand is slow but they are sold out for first quarter. Second quarter is a question mark at present.

Deferments on c-r sheet for March delivery are running about 10 to 15 pct according to **Pittsburgh** producers.

Deferments and some cancellations are slowing both sheets and strip, hot- and cold-rolled, at **Philadelphia.**

PLATE AND STRUCTURALS . . . Not bettering the picture at **Pittsburgh** are (1) requests from the military for larger set-asides, and (2) the tendency of mills to take a little more product for their own uses. However, light structurals and light plate are in somewhat easier supply.

At **Chicago,** plates and structurals are conversion items with space sold out through the first half. A new Northwestern Steel & Wire Co. mill is expected to supply some light angle beams and structurals by March.

Plate from the east is being offered in the **Cleveland** area at double the normal price and finding some takers.

Integrated mills at **Detroit** feel, with the slowdown in demand for other products, they may be able to roll more plate and structurals.

The plate situation will not be improved this coming month in the **Philadelphia** area — it'll get worse. That's because Bethlehem is temporarily shutting down its sheared plate mill at Sparrows Pt. as part of an enlargement program. If it's out for two months, as planned, loss will be 45,000 tons. Odds are tonnage loss will be even larger.

WIRE PRODUCTS . . . Farm area ordering picked up slightly at **Cleveland** in January. Manufacturers wire is on 2-6 weeks' delivery there and at **Chicago.** Merchant wire at **Cleveland** is available almost from stock on standard sizes due to the seasonal lull.

Producers of manufacturers wire at **Chicago** are gloomy because their auto industry buyers are not active. However, merchant products are making gains and ordering is about three times better than it was at the end of 1956.

TINPLATE . . . **Pittsburgh** mill shipments are running ahead of production. Despite capacity operations, the producers are lowering inventories on electrolytic tinplate. Demand for hot dipped continues to decline; black plate is about holding its own.

BAR . . . Consumers in **Pittsburgh** are getting all the bars they need, but mills are still operating at capacity. One large producer reports orders on hand for capacity operations in next 5 to 6 weeks.

Hot-rolled bar is easing at **Chicago.** Cold finishers are doing well, but are on short lead time, as customers seem to be buying only for direct consumption. At **Detroit** bars are described as "easy to get."

EXTRA INCREASES . . . Jones & Laughlin on 14 in. OD seamless pipe and high test API 5-LX grades of linepipe, effective Jan. 22. Youngstown Sheet and Tube on h-r bars, both merchant and special quality, and on concrete reinforcing bars, effective Jan. 29.

Republic Steel Corp., effective Jan. 25, made revisions in its extras for h-r bars, carbon and alloy, and for semi-finished steel. Changes on carbon bar extras are about 4 pct and on alloy grades they are less than 1 pct.

**Purchasing Agent's Checklist**

SPECIAL REPORT: Stability is returning to the steel market, IRON AGE inventory survey indicates . . . . . p. 19

MAINTENANCE: More planning is needed to cut its cost . . . . . p. 22

PAPERWORK: Ford Motor Co. reduces it by use of punched card system . . . . . p. 28

TECHNICAL: How to get more for your aluminum dollar p. 57

# Comparison of Prices

*(Effective Jan. 29, 1957)*

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

| | Jan. 29 1957 | Jan. 22 1957 | Jan. 1 1957 | Jan. 31 1956 |
|---|---|---|---|---|
| **Flat-Rolled Steel:** (per pound) | | | | |
| Hot-rolled sheets | 4.675¢ | 4.675¢ | 4.675¢ | 4.325¢ |
| Cold-rolled sheets | 5.75 | 5.75 | 5.75 | 5.325 |
| Galvanized sheets (10 ga.) | 6.30 | 6.30 | 6.30 | 5.85 |
| Hot-rolled strip | 4.675 | 4.675 | 4.675 | 4.325 |
| Cold-rolled strip | 6.870 | 6.870 | 6.870 | 6.29 |
| Plate | 4.87 | 4.87 | 4.87 | 4.52 |
| Plates, wrought iron | 10.40 | 10.40 | 10.40 | 10.40 |
| Stainl's C-R strip (No. 302) | 50.00 | 50.00 | 50.00 | 44.50 |
| **Tin and Terneplate:** (per base box) | | | | |
| Tinplate (1.50 lb.) cokes | $9.95 | $9.95 | $9.95 | $9.05 |
| Tin plates, electro (0.50 lb.) | 8.65 | 8.65 | 8.65 | 7.75 |
| Special coated mfg. ternes | 9.20 | 9.20 | 9.20 | 7.85 |
| **Bars and Shapes:** (per pound) | | | | |
| Merchant bars | 5.075¢ | 5.075¢ | 5.075¢ | 4.65¢ |
| Cold finished bars | 6.85 | 6.85 | 6.85 | 5.90 |
| Alloy bars | 6.125 | 6.125 | 6.125 | 5.65 |
| Structural shapes | 5.00 | 5.00 | 5.00 | 4.60 |
| Stainless bars (No. 302) | 43.25 | 43.25 | 43.25 | 38.25 |
| Wrought iron bars | 11.50 | 11.50 | 11.50 | 11.50 |
| **Wire:** (per pound) | | | | |
| Bright wire | 7.20¢ | 7.20¢ | 7.20¢ | 6.25¢ |
| **Rails:** (per 100 lb.) | | | | |
| Heavy rails | $5.075 | $5.075 | $5.075 | $4.725 |
| Light rails | 6.00 | 6.00 | 6.00 | 5.65 |
| **Semifinish Steel:** (per net ton) | | | | |
| Rerolling billets | $74.00 | $74.00 | $74.00 | $68.50 |
| Slabs, rerolling | 74.00 | 74.00 | 74.00 | 68.50 |
| Forging billets | 91.50 | 91.50 | 91.50 | 84.50 |
| Alloy blooms, billets, slabs | 107.00 | 107.00 | 107.00 | 96.00 |
| **Wire Rod and Skelp:** (per pound) | | | | |
| Wire rods | 5.80¢ | 5.80¢ | 5.80¢ | 5.025¢ |
| Skelp | 4.225 | 4.225 | 4.225 | 4.225 |
| **Finished Steel Composite:** (per pound) | | | | |
| Base price | 5.622¢ | 5.622¢ | 5.622¢ | 5.174¢ |

| | Jan. 29 1957 | Jan. 22 1957 | Jan. 1 1957 | Jan. 31 1956 |
|---|---|---|---|---|
| **Pig Iron:** (per gross ton) | | | | |
| Foundry, del'd Phila. | $66.88 | $66.88 | $66.88 | $63.69 |
| Foundry, Valley | 63.00 | 63.00 | 63.00 | 59.00 |
| Foundry, Southern Cin'ti | 67.17 | 67.17 | 67.17 | 62.93 |
| Foundry, Birmingham | 59.00 | 59.00 | 59.00 | 55.00 |
| Foundry, Chicago | 63.00 | 63.00 | 63.00 | 59.00 |
| Basic del'd Philadelphia | 66.38 | 66.38 | 66.38 | 62.77 |
| Basic Valley furnace | 62.50 | 62.50 | 62.50 | 58.50 |
| Malleable, Chicago | 63.00 | 63.00 | 63.00 | 59.00 |
| Malleable, Valley | 63.00 | 63.00 | 63.00 | 59.00 |
| Ferromanganese, cents per lb‡ (74 to 76 pct Mn base.) | 12.75¢ | 12.75¢ | 11¾-12¾¢ | 9.50¢ |
| **Pig Iron Composite:** (per gross ton) | | | | |
| Pig iron | $62.90 | $62.90 | $62.90 | $59.09 |
| **Scrap:** (per gross ton) | | | | |
| No. 1 steel, Pittsburgh | *$54.50* | $59.50 | $65.50 | $50.50 |
| No. 1 steel, Phila. area | *57.50* | 58.50 | 62.50 | 52.50 |
| No. 1 steel, Chicago | *54.50* | 55.50 | 62.50 | 49.50 |
| No. 1 bundles, Detroit | *54.50* | 49.50 | 55.00 | 46.00 |
| Low phos., Youngstown | *57.50* | 65.50 | 67.50 | 54.50 |
| No. 1 mach'y cast, Pittsburgh | *59.50* | 60.50 | 61.50 | 55.50 |
| No. 1 mach'y cast, Philadel'a | 60.50 | 60.50 | 60.50 | 56.50 |
| No. 1 mach'y cast, Chicago | *53.50* | 54.50 | 57.50 | 52.50 |
| **Steel Scrap Composite:** (per gross ton) | | | | |
| No. 1 heavy melting scrap | *$53.50* | $57.83 | $63.50 | $50.83 |
| **Coke, Connellsville:** (per net ton at oven) | | | | |
| Furnace coke, prompt | $15.38 | $15.38 | $15.50 | $14.25 |
| Foundry coke, prompt | $17.50-$19 | $17.50-$19 | $18-19 | $16.25 |
| **Nonferrous Metals:** (cents per pound to large buyers) | | | | |
| Copper, electrolytic, Conn. | 36.00 | 36.00 | 36.00 | 43.00 |
| Copper, Lake, Conn. | 36.00 | 36.00 | 36.00 | 43.00 |
| Tin, Straits, New York | 102.50† | 101.75 | 101.00 | 102.00 |
| Zinc, East St. Louis | 13.50 | 13.50 | 13.50 | 13.50 |
| Lead, St. Louis | 15.80 | 15.80 | 15.80 | 15.80 |
| Aluminum, virgin ingot | 27.10 | 27.10 | 27.10 | 24.40 |
| Nickel, electrolytic | 74.00 | 74.00 | 74.00 | 64.50 |
| Magnesium, ingot | 36.00 | 36.00 | 36.00 | 33.25 |
| Antimony, Laredo, Tex. | 33.00 | 33.00 | 33.00 | 33.00 |

† Tentative. ‡ Average * Revised.

**Finished Steel Composite**

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite**

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

**Steel Scrap Composite**

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

## PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 116→

| Producing Point | Basic | Fdry. | Mall. | Bess. | Low Phos. |
|---|---|---|---|---|---|
| Birdsboro, Pa. *B6* | 64.50 | 65.00 | 65.50 | 66.00 | ..... |
| Birmingham *R3* | 58.50 | 59.00* | ..... | ..... | ..... |
| Birmingham *W9* | 58.50 | 59.00* | 63.00 | ..... | ..... |
| Birmingham *U4* | 58.50 | 59.00* | 63.00 | ..... | ..... |
| Buffalo *R3* | 62.50 | 63.00 | 63.50 | 64.00 | ..... |
| Buffalo *H1* | 62.50 | 63.00 | 63.50 | ..... | ..... |
| Buffalo *W6* | 62.50 | 63.00 | 63.50 | 64.00 | ..... |
| Chester *P2* | 64.50 | 65.00 | 65.50 | ..... | ..... |
| Chicago *I4* | 62.50 | 63.00 | 63.00 | 63.50 | ..... |
| Cleveland *A5* | 62.50 | 63.00 | 63.00 | 63.50 | 67.50† |
| Cleveland *R3* | 62.50 | 63.00 | 63.00 | 63.50 | ..... |
| Duluth *I4* | 62.50 | 63.00 | 63.00 | 63.50 | 67.50† |
| Erie *I4* | 62.50 | 63.00 | 63.00 | 63.50 | 67.50† |
| Everett *M6* | ..... | 65.00 | 65.50 | ..... | ..... |
| Fontana *K1* | 70.50 | 71.00 | ..... | ..... | ..... |
| Geneva, Utah *C7* | 62.50 | 63.00 | ..... | ..... | ..... |
| Granite City *G2* | 64.40 | 64.90 | 65.40 | ..... | ..... |
| Hubbard *Y1* | ..... | ..... | 63.00 | ..... | ..... |
| Lone Star *L3* | 58.50‡ | 59.00‡ | ..... | ..... | ..... |
| Midland *C11* | 62.50 | ..... | ..... | ..... | ..... |
| Minnequa *C6* | 64.50 | 65.00 | 65.50 | ..... | ..... |
| Monessen *P6* | 62.50 | ..... | ..... | ..... | ..... |
| Neville Is. *P4* | 62.50 | 63.00 | 63.00 | 63.50 | 67.50† |
| N. Tonawanda *T1* | ..... | 63.00 | 63.50 | 64.00 | ..... |
| Pittsburgh *U1* | 62.50 | ..... | 63.00 | 63.50 | ..... |
| Sharpsville *S3* | 62.50 | 63.00 | 63.00 | 63.50 | ..... |
| So. Chicago *R3* | 62.50 | 63.00 | 63.00 | ..... | ..... |
| Swedeland *A2* | 64.50 | 65.00 | 65.50 | 65.50 | ..... |
| Toledo *I4* | 62.50 | 63.00 | 63.00 | 63.50 | ..... |
| Troy, N. Y. *R3* | 64.50 | 65.00 | 65.50 | 66.00 | 70.50 |
| Youngstown *Y1* | ..... | ..... | 63.00 | 63.50 | ..... |

**DIFFERENTIALS:** Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos. ‡ Add $1.00 for 0.31 to 0.50 pct phos.

Silvery Iron: Buffalo, *H1*, $72.50; Jackson, *J1, I4* (Globe Div.), $71.50; Niagara Falls (15.01-15.50), $99.50; Keokuk (14.01-14.50), $110.00; (15.51-16.00), $105.00. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.00 pct. Bessemer silvery pig iron (under .10 pct phos.): $64.00. Add $1.00 premium for all grades silvery 6 pct to 14 pct.

## STAINLESS STEEL

Base price cents per lb f.o.b. mill

| Product | 201 | 202 | 301 | 302 | 303 | 304 | 316 | 321 | 347 | 403 | 410 | 416 | 430 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ingots, reroll. | 21.25 | 22.75 | 22.25 | 24.25 | — | 26.00 | 38.25 | 31.00 | 35.50 | — | 16.00 | 27.75 | 16.25 |
| Slabs, billets | 26.00 | 29.00 | 27.00 | 30.25 | 30.75 | 32.00 | 47.50 | 38.50 | 44.75 | — | 20.75 | — | 21.00 |
| Billets, forging | — | 35.00 | 35.75 | 36.50 | 39.50 | 39.00 | 59.75 | 45.25 | 53.50 | 30.75 | 27.25 | 27.75 | 27.75 |
| Bars, struct. | — | 41.25 | 42.50 | 43.25 | 46.25 | 46.00 | 70.25 | 53.25 | 62.25 | 36.25 | 32.50 | 33.00 | 33.00 |
| Plates | — | 43.25 | 44.50 | 45.50 | 48.00 | 48.75 | 73.75 | 57.50 | 67.00 | 38.75 | 33.75 | 35.50 | 34.50 |
| Sheets | 46.75 | 47.25 | 49.25 | 50.00 | — | 53.25 | 78.25 | 63.00 | 76.25 | 46.50 | 38.75 | 46.50 | 39.25 |
| Strip, hot-rolled | 34.50 | 37.50 | 35.75 | 39.00 | — | 42.50 | 66.50 | 51.50 | 61.00 | — | 29.75 | — | 30.75 |
| Strip, cold-rolled | 43.25 | 47.25 | 45.75 | 50.00 | — | 53.25 | 78.25 | 63.00 | 76.25 | 46.50 | 38.75 | 46.50 | 39.25 |
| Wire CF; Rod HR | — | 39.25 | 40.25-40.50 | 41.00-41.25 | 44.00 | 43.75 | 66.75-67.00 | 50.50-51.00 | 59.25-59.50 | 34.50 | 31.00 | 31.50 | 31.50 |

STAINLESS STEEL PRODUCING POINTS:

*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J3;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne *J4;* Philadelphia, *D5.*

*Strip:* Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *C5;* Sharon, Pa., *S1;* Butler, Pa., *A7;* Wallingford, Conn., *U3* (plus further conversion extras); *W1* New Bedford, Mass. (*.25¢ per lb higher*), *R6;* Gary, *U1* (*.25¢* per lb higher).

*Bar:* Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5;* Ft. Wayne, *I4;* Philadelphia, *D5;* Detroit, *R5;* Gary, *U1.*

*Wire:* Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

*Structurals:* Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

*Plates:* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown; *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Philadelphia, *D5;* Vandergrift, Pa., *U1;* Gary, *U1.*

*Forgings billets:* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1.*

IRON AND STEEL SCRAP MARKETS

# Market Collapse Threatens

**Big drop in auto list prices prompts major decline in most markets . . . Poor collections and low dealer inventories may put floor under market . . . Composite down $2.33.**

◆ CONTINUED declines over a period of weeks have brought the market to a critical point.

Closing of first automotive lists early this week at about $10 under the previous month's level threatened the markets in some areas with near collapse.

Almost all consuming areas reflected the bearish trend that sent THE IRON AGE Composite Price down $2 to $55.83, the lowest point since early August, 1956.

Only severe winter weather, which has kept collections at a minimum, and continued strong export in most port cities have prevented the bottom from dropping out of the market.

Although prices may decline further, there is little prospect of a real market panic. There is no great abundance of scrap and outlook for a strong mill operating rate is favorable.

But, particularly in the Midwest, the trade is affected by predictions of a much lower operating rate in the second quarter. This is not backed up by the steel market outlook, but bearish stories and rumors have put a scare into some markets.

Only St. Louis, where poor collections put some floor under the market price level, and the East fought off serious declines. Most eastern markets fell off $1, but prices there have resisted declines more firmly than in other areas.

Mill purchases in Pittsburgh brought the price of No. 1 grades down a full $5, one of the most significant declines there in some time. But, here again there is no apparent scrap surplus.

Recent declines in the market may have taken some of the heat off possible action in Congress to curb exports of scrap.

**Pittsburgh** . . . Prices have dropped sharply here. No. 1 and No. 2 heavy melting are both down $5. Early lists indicate a Pittsburgh price of $60 for No. 1 factory bundles. This represents a drop of $7. Railroad and low phos grades are down in sympathy with industrial grades. Cast and blast furnace grades are off $1. Current weakness is not the result of an oversupply of scrap. Collections are still slow and dealers are not scrambling to sell. But mills have comfortable inventories and talk of a drop in operating rate has had its effect.

**Chicago** . . . With mill offers at reduced prices expected, broker offering prices are again slipping. The word is out that first quarter mill buying will not be as strong as previously expected. Nor is it expected to be as high as needed to meet current operating rates. Right or wrong, the long-range forecast in the trade is pegged on a slowing of mill operations in the second quarter. This does not seem to be justified by the mill outlook.

**Philadelphia** . . . This market continues to soften. Steelmaking and some blast furnace grades dropped $1, based on local mill purchases. The mills bought sparingly, however. One area mill that has a blast furnace down for repairs is buying considerable tonnages of cast iron at going prices. Export is taking a lot of scrap out of the district.

**New York** . . . Prices of steelmaking and blast furnace grades, which held the line rather shakily last week, dropped $1 this week. Pressure causing the decline was brought on by purchases by eastern Pennsylvania mills.

**Detroit** . . . Prices continue to drop on the basis of bidding on first auto lists to close in the area. Bids were off as much as $10 on the first two lists to close. Indications are that the market may drop even lower. No. 1 and No. 2 grades, which had declined during the month, are still off $4. No. 1 factory bundles averaged $50.

**Cleveland** . . . A local mill made the first purchase in many weeks early this week for $54, thus helping establish a local price. First and biggest auto list here went for little over $53 for No. 1 industrial grades. This drop of over $10 brought the market bears out in force. Remaining lists should follow suit or bring even less. On bright side of dealer outlook—continued high steelmaking rate, low dealer inventories.

**Birmingham** . . . Although no buys are reported in the district, brokers are offering No. 2 grades at $2 to $3 per ton under last sales. No. 1 grades remain unchanged. Electric furnace items, which have been extremely high, have taken big drops. The cast market continues firm, although supplies seem plentiful. Exporters, generally, are out of the market or making limited purchases at lower prices.

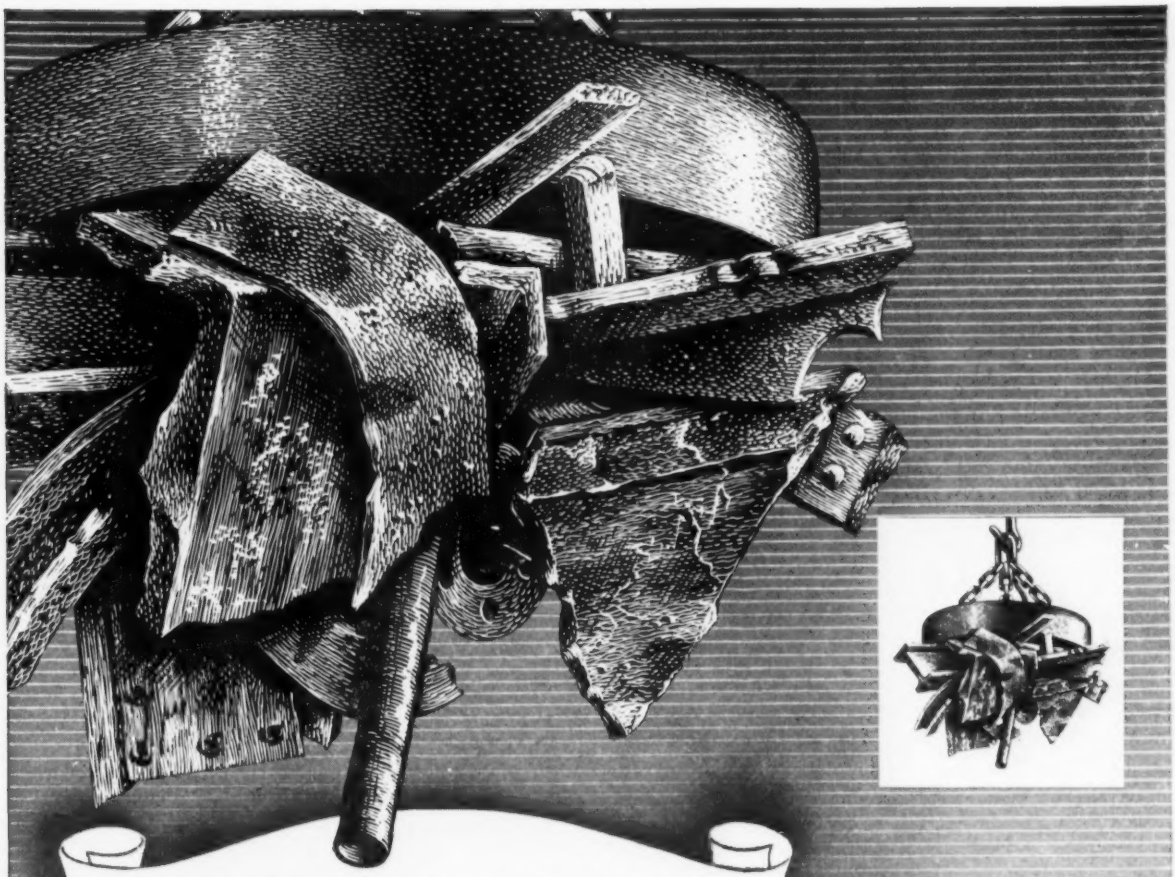
**St. Louis** . . . Shipments of scrap have slowed as a result of cold weather and resistance to price declines. Openhearth grades continue at present prices and mills will probably make no changes for a few weeks. Foundry grades are off. Since local consumers aren't buying, cast must move out of the district. Railroad grades are off sharply.

**Cincinnati** . . . The market settled another $2 with absence of new orders and expected lower buying prices by area mills. Dealer inventories are about average. No new sales are expected before announcement of February program late this week.

**Buffalo** . . . Prices of steelmaking grades are off $5 in a very weak market. Although no sales were made, weakness in other areas is reflected in prices here. The local market is expected to be tested in about a week. A shortage of gondola cars is hampering movement of what little scrap dealers have.

**Boston** . . . Activity in this market remains slow. Export is off, because no ships are available at the moment. Most local consumers are out of the market and shipments out of the area are slow.

**West Coast** . . . There's a lot of talk of a price decline soon. Flow of scrap is good. Mills are making their melt easily. But exporting is still at a furious pace with large tonnages headed for Japan.



# A SYMBOL OF LEADERSHIP IN IRON & STEEL SCRAP SINCE 1889

## *Luria Brothers and Company, Inc.*

MAIN OFFICE
**PHILADELPHIA NATIONAL BANK BLDG.**
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA.
MODENA, PENNA. PITTSBURGH, PENNA.
ERIE, PENNA.

OFFICES
BIRMINGHAM, ALA. DETROIT, MICH. PUEBLO, COLORADO
BOSTON, MASS. HOUSTON, TEXAS READING, PENNA
BUFFALO, N. Y. LEBANON, PENNA. ST. LOUIS, MO
CHICAGO, ILLINOIS LOS ANGELES, CAL. SAN FRANCISCO, CAL.
CLEVELAND, OHIO NEW YORK, N. Y. SEATTLE, WASH
PITTSBURGH, PA.
*in Canada* MONTREAL, QUEBEC HAMILTON, ONTARIO

EXPORTS-IMPORTS **LIVINGSTON & SOUTHARD, INC.** 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

# Scrap Prices *(Effective Jan. 29, 1957)*

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

### Pittsburgh

| | |
|---|---|
| No. 1 hvy. melting | $54.00 to $55.00 |
| No. 2 hvy. melting | 48.00 to 49.00 |
| No. 1 dealer bundles | 54.00 to 55.00 |
| No. 1 factory bundles | 57.00 to 58.00 |
| No. 2 bundles | 45.00 to 46.00 |
| Machine shop turn. | 39.00 to 40.00 |
| Mixed bor. and ms. turn. | 39.00 to 40.00 |
| Shoveling turnings | 43.00 to 44.00 |
| Cast iron borings | 43.00 to 44.00 |
| Low phos. punch'gs plate | 59.00 to 60.00 |
| Heavy turnings | 49.00 to 50.00 |
| No. 1 RR hvy. melting | 57.00 to 58.00 |
| Scrap rails, random lgth. | 70.00 to 71.00 |
| Rails 2 ft and under | 74.00 to 75.00 |
| RR steel wheels | 66.00 to 67.00 |
| RR spring steel | 66.00 to 67.00 |
| RR couplers and knuckles | 66.00 to 67.00 |
| No. 1 machinery cast. | 59.00 to 60.00 |
| Cupola cast. | 52.00 to 53.00 |
| Heavy breakable cast. | 50.00 to 51.00 |

### Chicago

| | |
|---|---|
| No. 1 hvy. melting | $54.00 to $55.00 |
| No. 2 hvy. melting | 45.00 to 46.00 |
| No. 1 dealer bundles | 55.00 to 56.00 |
| No. 1 factory bundles | 59.00 to 60.00 |
| No. 2 bundles | 41.00 to 42.00 |
| Machine shop turn. | 35.00 to 36.00 |
| Mixed bor. and turn. | 37.00 to 38.00 |
| Shoveling turnings | 37.00 to 38.00 |
| Cast iron borings | 37.00 to 38.00 |
| Low phos. forge crops | 66.00 to 67.00 |
| Low phos. punch'gs plate | 60.00 to 62.00 |
| Low phos. 3 ft and under | 60.00 to 61.00 |
| No. 1 RR hvy. melting | 60.00 to 62.00 |
| Scrap rails, random lgth. | 72.00 to 73.00 |
| Rerolling rails | 74.00 to 75.00 |
| Rails 2 ft and under | 77.00 to 78.00 |
| Locomotive tires, cut | 64.00 to 65.00 |
| Cut bolsters & side frames | 64.00 to 65.00 |
| Angles and splice bars | 69.00 to 70.00 |
| RR. steel car axles | 80.00 to 82.00 |
| RR. couplers and knuckles | 63.00 to 64.00 |
| No. 1 machinery cast. | 53.00 to 54.00 |
| Cupola cast | 49.00 to 50.00 |
| Heavy breakable cast. | 46.00 to 47.00 |
| Cast iron brake shoe | 45.00 to 46.00 |
| Cast iron wheels | 55.00 to 56.00 |
| Malleable | 69.00 to 70.00 |
| Stove plate | 45.00 to 47.00 |
| Steel car wheels | 63.00 to 64.00 |

### Philadelphia Area

| | |
|---|---|
| No. 1 hvy. melting | $57.00 to $58.00 |
| No. 2 hvy. melting | 49.00 to 50.00 |
| No. 1 dealer bundles | 57.00 to 58.00 |
| No. 2 bundles | 47.00 to 48.00 |
| Machine shop turn. | 41.00 to 42.00 |
| Mixed bor. short turn. | 43.00 to 44.00 |
| Cast iron borings | 43.00 to 44.00 |
| Shoveling turnings | 45.00 to 46.00 |
| Clean cast chem. borings | 49.00 to 50.00 |
| Low phos. 5 ft and under | 62.00 to 63.00 |
| Low phos. 2 ft and under | 64.00 to 65.00 |
| Low phos. punch'gs | 64.00 to 65.00 |
| Elec. furnace bundles | 60.00 to 61.00 |
| Heavy turnings | 53.00 to 54.00 |
| RR. steel wheels | 71.00 to 72.00 |
| RR. spring steel | 71.00 to 72.00 |
| Rails 18 in. and under | 80.00 to 81.00 |
| Cupola cast | 53.00 to 56.00 |
| Heavy breakable cast. | 58.00 to 59.00 |
| Cast iron car wheels | 64.00 to 65.00 |
| Malleable | 66.00 to 67.00 |
| Unstripped motor blocks | 44.00 to 45.00 |
| No. 1 machinery cast. | 60.00 to 61.00 |

### Cleveland

| | |
|---|---|
| No. 1 hvy. melting | $53.00 to $54.00 |
| No. 2 hvy. melting | 45.00 to 46.00 |
| No. 1 dealer bundles | 53.00 to 54.00 |
| No. 1 factory bundles | 54.50 to 55.50 |
| No. 2 bundles | 40.00 to 41.00 |
| No. 1 busheling | 53.00 to 54.00 |
| Machine shop turn. | 32.00 to 33.00 |
| Mixed bor. and turn. | 35.00 to 36.00 |
| Shoveling turnings | 35.00 to 36.00 |
| Cast iron borings | 35.00 to 36.00 |
| Cut struct'r'l & plates, 2 ft & under | 59.00 to 60.00 |
| Drop forge flashings | 53.00 to 54.00 |
| Low phos. punch'gs, plate | 54.00 to 55.00 |
| Foundry steel, 2 ft & under | 56.00 to 57.00 |
| No. 1 RR. heavy melting | 59.00 to 60.00 |
| Rails 2 ft and under | 73.00 to 74.00 |
| Rails 18 in. and under | 74.00 to 75.00 |
| Railroad grate bars | 39.00 to 40.00 |
| Steel axle turnings | 37.00 to 38.00 |
| Railroad cast. | 57.00 to 58.00 |
| No. 1 machinery cast. | 55.00 to 56.00 |
| Stove plate | 51.00 to 52.00 |
| Malleable | 64.00 to 65.00 |

### Youngstown

| | |
|---|---|
| No. 1 hvy. melting | $56.00 to $57.00 |
| No. 2 hvy. melting | 49.00 to 50.00 |
| No. 1 dealer bundles | 56.00 to 57.00 |
| No. 2 bundles | 44.00 to 45.00 |
| Machine shop turn. | 31.00 to 32.00 |
| Shoveling turnings | 37.00 to 38.00 |
| Cast iron borings | 56.00 to 57.00 |
| Low phos. plate | 57.00 to 58.00 |

### Buffalo

| | |
|---|---|
| No. 1 hvy. melting | $53.00 to $54.00 |
| No. 2 hvy. melting | 43.00 to 44.00 |
| No. 1 busheling | 53.00 to 54.00 |
| No. 1 dealer bundles | 53.00 to 54.00 |
| No. 2 bundles | 38.00 to 39.00 |
| Machine shop turn. | 31.00 to 32.00 |
| Mixed oor. and turn. | 31.00 to 32.00 |
| Shoveling turnings | 31.00 to 32.00 |
| Cast iron borings | 32.00 to 33.00 |
| Low phos. plate | 58.00 to 59.00 |
| Scrap rails, random lgth. | 63.00 to 64.00 |
| Rails 2 ft and under | 79.00 to 80.00 |
| RR. steel wheels | 65.00 to 66.00 |
| RR. spring steel | 60.00 to 61.00 |
| RR. couplers and knuckles | 74.00 to 75.00 |
| No. 1 machinery cast. | 49.00 to 50.00 |
| No. 1 cupola cast. | 48.00 to 49.00 |

### Detroit

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $45.00 to $46.00 |
| No. 2 hvy. melting | 48.00 to 49.00 |
| No. 1 dealer bundles | 45.00 to 46.00 |
| No. 2 bundles | 34.00 to 35.00 |
| New busheling | 45.00 to 46.00 |
| Drop forge flashings | 44.50 to 45.50 |
| Machine shop turn. | 28.00 to 29.00 |
| Mixed bor. and turn. | 31.00 to 32.00 |
| Shoveling turnings | 31.00 to 32.00 |
| Cast iron borings | 31.00 to 32.00 |
| Low phos. punch'gs, plate | 45.00 to 46.00 |
| No. 1 cupola cast. | 51.00 to 52.00 |
| Heavy breakable cast. | 44.00 to 45.00 |
| Stove plate | 45.00 to 46.00 |
| Automotive cast. | 54.00 to 55.00 |

### St. Louis

| | |
|---|---|
| No. 1 hvy. melting | $53.00 to $54.00 |
| No. 2 hvy. melting | 46.50 to 47.50 |
| No. 1 dealer bundles | 53.00 to 54.00 |
| No. 2 bundles | 41.50 to 42.50 |
| Machine shop turn. | 37.00 to 38.00 |
| Cast iron borings | 39.00 to 40.00 |
| Shoveling turnings | 38.00 to 39.00 |
| No. 1 RR. hvy. melting | 56.00 to 57.00 |
| Rails, random lengths | 67.00 to 68.00 |
| Rails 18 in. and under | 77.00 to 78.00 |
| Locomotive tires uncut | 58.00 to 59.00 |
| Angles and splice bars | 59.00 to 60.00 |
| Std. steel car axles | 74.00 to 75.00 |
| RR. specialties | 59.00 to 60.00 |
| Cupola cast. | 49.00 to 50.00 |
| Heavy breakable cast. | 40.00 to 41.00 |
| Cast iron brake shoes | 49.00 to 50.00 |
| Stove plate | 43.00 to 44.00 |
| Cast iron car wheels | 54.00 to 55.00 |
| Rerolling rails | 71.00 to 72.00 |
| Unstripped motor blocks | 40.50 to 41.50 |

### Boston

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $48.00 to $49.00 |
| No. 2 hvy. melting | 39.00 to 40.00 |
| No. 1 dealer bundles | 48.00 to 49.00 |
| No. 2 bundles | 37.50 to 38.50 |
| No. 1 busheling | 48.00 to 49.00 |
| Elec. furnace, 3 ft & under | 54.50 to 55.50 |
| Machine shop turn. | 31.50 to 32.50 |
| Mixed bor. and short turn. | 33.50 to 34.50 |
| Shoveling turnings | 36.00 to 37.00 |
| Clean cast chem. borings | 37.00 to 38.00 |
| No. 1 machinery cast. | 47.00 to 48.00 |
| Mixed cupola cast. | 42.50 to 43.50 |
| Heavy breakable cast. | 46.00 to 47.00 |
| Stove plate | 41.00 to 42.00 |
| Unstripped motor blocks | 33.00 to 34.00 |

### New York

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $52.00 to $53.00 |
| No. 2 hvy. melting | 44.00 to 45.00 |
| No. 2 dealer bundles | 41.00 to 42.00 |
| Machine shop turn. | 33.00 to 34.00 |
| Mixed bor. and turn. | 37.00 to 38.00 |
| Shoveling turnings | 37.00 to 38.00 |
| Clean cast chem. borings | 33.00 to 34.00 |
| No. 1 machinery cast. | 51.00 to 52.00 |
| Mixed yard cast. | 48.00 to 49.00 |
| Charging box cast. | 48.00 to 49.00 |
| Heavy breakable cast. | 49.00 to 50.00 |
| Unstripped motor blocks | 39.00 to 40.00 |

### Birmingham

| | |
|---|---|
| No. 1 hvy. melting | $46.00 to $47.00 |
| No. 2 hvy. melting | 41.00 to 42.00 |
| No. 1 dealer bundles | 46.00 to 47.00 |
| No. 2 bundles | 36.00 to 37.00 |
| No. 1 busheling | 46.00 to 47.00 |
| Machine shop turn. | 37.00 to 38.00 |
| Shoveling turnings | 38.00 to 39.00 |
| Cast iron borings | 27.00 to 28.00 |
| Electric furnace bundles | 52.00 to 53.00 |
| Bar crops and plate | 57.00 to 58.00 |
| Structural and plate, 2 ft | 57.00 to 58.00 |
| No. 1 RR. hvy. melting | 53.00 to 54.00 |
| Scrap rails, random lgth. | 64.00 to 65.00 |
| Rails, 18 in. and under | 71.00 to 72.00 |
| Angles & splice bars | 63.00 to 64.00 |
| Rerolling rails | 64.00 to 65.00 |
| No. 1 cupola cast. | 53.00 to 54.00 |
| Stove plate | 51.00 to 52.00 |
| Charging box cast. | 40.00 to 41.00 |
| Cast iron car wheels | 45.00 to 46.00 |
| Unstripped motor blocks | 44.00 to 45.00 |
| Mashed tin cans | 15.00 to 16.00 |
| Elec. furnace, 2 ft & under | 52.00 to 53.00 |

### Cincinnati

**Brokers buying prices per gross ton, on cars:**

| | |
|---|---|
| No. 1 hvy. melting | $56.00 to $57.00 |
| No. 2 hvy. melting | 46.00 to 47.00 |
| No. 1 dealer bundles | 56.00 to 57.00 |
| No. 2 bundles | 40.00 to 41.00 |
| Machine shop turn. | 38.00 to 39.00 |
| Mixed bor and turn. | 36.00 to 37.00 |
| Shoveling turnings | 41.00 to 42.00 |
| Cast iron borings | 36.00 to 37.00 |
| Low phos. 18 in. & under | 62.00 to 63.00 |
| Rails, random lengths | 69.00 to 70.00 |
| Rails, 18 in. and under | 77.00 to 78.00 |
| No. 1 cupola cast. | 47.00 to 48.00 |
| Hvy. breakable cast. | 46.00 to 47.00 |
| Drop broken cast. | 57.00 to 58.00 |

### San Francisco

| | |
|---|---|
| No. 1 hvy. melting | $59.00 |
| No. 2 hvy. melting | 57.00 |
| No. 1 dealer bundles | 58.00 |
| No. 2 bundles | 44.00 |
| Machine shop turn. | $37.00 to 38.00 |
| Cast iron borings | 38.00 |
| No. 1 RR. hvy. melting | 60.00 |
| No. 1 cupola cast. | 60.00 |

### Los Angeles

| | |
|---|---|
| No. 1 hvy. melting | $59.00 |
| No. 2 hvy. melting | 57.00 |
| No. 1 dealer bundles | 58.00 |
| No. 2 bundles | 40.00 |
| Machine shop turn. | 37.00 |
| Shoveling turnings | 40.00 |
| Cast iron borings | 37.00 |
| Elec. furn. 1 ft. and under (foundry) | 70.00 |
| No. 1 RR. hvy. melting | 60.00 |
| No. 1 cupola cast. | 60.00 |

### Seattle

| | |
|---|---|
| No. 1 hvy. melting | $59.00 |
| No. 2 hvy. melting | 54.00 |
| No. 2 bundles | $33.00 to 35.00 |
| No. 1 cupola cast. | 55.00 |
| Mixed yard cast. | 55.00 |

### Hamilton Ont.

| | |
|---|---|
| No. 1 hvy. melting | $54.00 |
| No. 2 hvy. melting | 47.00 |
| No. 1 dealer bundles | 54.00 |
| No. 2 bundles | 40.50 |
| Mixed steel scrap | 46.00 |
| Busheling | 39.50 |
| Bush., new fact., prep'd. | 52.00 |
| Bush., new fact., unprep'd. | 48.60 |
| Machine shop turn. | 31.00 |
| Short steel turn. | 35.00 |
| Mixed bor. and turn. | 28.00 |
| Rails, rerolling | 60.00 |
| Cast scrap | 50.00 |

# Earth Movers

Ancient Egypt and Assyria used back-breaking labor to dig canals long before the Christian Era. Leading from the gates of Rome to Capua, the Appian Way was started by Appius Claudius about 312 B.C. In the thirteenth century, the 650-mile Grand Canal from the Yang-tse-kiang to the Pei-ho was constructed by the Chinese. The Mont Cenis tunnel, first through the Alps, was completed in 1870. 135,000,000 cubic yards of dirt and rock were removed to clear the Panama Canal.

Today's great power-driven equipment multiply a thousand fold the picks, shovels and human muscle of just a few decades ago. Irrigation, drainage, canals, tunnels—and America's vast new road building program — all are "must" demands for earth-moving machines. To meet these and a thousand other requirements for steel, America's mills must be assured an unfailing supply of scrap.

***For the purchase or sale of iron or steel scrap . . .***

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# Outlook For Gov't Zinc Buying

**Major producers expect zinc stockpiling to continue through 1957 . . . Majority say price will hold . . . Some report higher labor costs will cause price increase.**

◆ ZINC PRODUCERS believe government stockpiling of zinc will continue through 1957.

But American Zinc Institute reports it is "very probable" the government has almost reached its stockpile goal of 300,000 tons.

Zinc executives polled by THE IRON AGE affirm the possibility of a full zinc stockpile shortly. But some point out that since no statistics are actually available it may be the minimum, rather than long term requirements which will be satisfied. In that case the government is expected to continue buying surplus domestic production.

Others are sure the government will continue its program of bartering surplus American farm products for foreign zinc. This metal is kept in a supplementary stockpile, and is not placed on the domestic market. This supports the domestic market since surplus foreign production would glut U. S. markets.

None of the executives polled believe the price will drop as long as stockpiling continues. About 60 pct feel the market situation—and the price—will remain the same. "The stockpiling is holding up the price now," says one producer.

The remainder expect a higher price. "Since our customers carry almost no inventory, a sudden spurt in demand would push the price up," says one smelter. Another cites the higher wages he, and others will have to pay this summer as the impetus for a higher price.

All agree that if they guess wrong and the government does drop out of the zinc market the price would have to fall. Zinc has a long history of frequent price fluctuation, because prices traditionally adhere closely to supply and demand.

As the situation now stands, production of slab zinc in 1956 set an all time record, 1,062,954 tons, according to the Zinc Institute. However consumption was down to 994,000 tons from 1,119,812 tons in 1955. And 1956 shipments were off despite the largest tonnage ever credited to the government's account.

Even though the Institute expects consumption to close the supply-demand gap somewhat in 1957, it would not be enough to match production without government buying.

Galvanizing and die casting purchases are expected to increase substantially. This might prevent prices from sliding too far should the government get out of the market.

A major factor in any government decision would be production flexibility. A price drop would close up marginal mines, most of which are older and work leaner ores. Once closed it is rarely economically feasible to reopen a marginal mine.

Most of the zinc producers queried believe the number of mines forced to close if stockpiling were ended would be substantial, but that tonnages affected would be small.

## Primary Prices

| (cents per lb) | Current price | last price | date of change |
|---|---|---|---|
| Aluminum ingot | 27.10 | 25.90 | 8 10 56 |
| Aluminum pig | 25.00 | 24.00 | 8 10 56 |
| Copper (E) | 36.00 | 40.00 | 10 26 56 |
| Copper (CS) | 34.575 | 34.825 | 1 24 57 |
| Copper (L) | 36.00 | 40.00 | 10 27 56 |
| Lead, St. L. | 15.80 | 16.30 | 1 13 56 |
| Lead, N. Y. | 16.00 | 16.50 | 1 13 56 |
| Magnesium ingot | 36.00 | 34.50 | 8 13 56 |
| Magnesium pig | 35.25 | 33.75 | 8 13 56 |
| Nickel | 74.00 | 64.50 | 12 6 56 |
| Titanium sponge | 250-275 | 270-300 | 12 4 56 |
| Zinc, E. St. L. | 13.50 | 13.00 | 1 6 56 |
| Zinc, N. Y. | 14.00 | 13.50 | 1 6 56 |

**ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic, (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. Velasco, Tex. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 112.**

COPPER . . . Officials of the Copper and Brass Research Assn. are conferring with Rep. James T. Patterson (R.-Conn.) in Washington to map strategy for an all-out assault on foreign brass mill products.

A number of the members of the association, also Congressman Patterson's constituents, report foreign mill products are underselling them to the point where it is serious.

The Patterson forces will be satisfied if they can get support for an open hearing to acquaint the public with the problem.

Clarence Hancock, Bridgeport Brass Co., is preparing a full report for presentation to Office of Defense Mobilization for possible executive action.

According to the Association, chief markets hit, and degree of penetration by foreign brass mill imports are:

| | |
|---|---|
| Seamless copper tube | — 5.3 pct |
| Copper sheet | — 6.8 pct |
| Copper rod | — 2.1 pct |
| Copper base alloy sheet, | |
| strip | — 1.5 pct |
| rod | — 3 pct |
| seamless tube | — 14 pct |
| wire | — 1 pct |

The Copper and Brass group points out that these statistics do not tell the whole story. It adds that the copper base alloy seamless tube imports represent nearly 100 pct of the brass tube for plumbers' brass goods, and some other items.

ALUMINUM . . . Production in the Northwest is being cut back about 25 pct. The reason: extreme cold weather has so increased demand for power from the Bonneville Power Administration, that the federal agency is cutting off interruptible power to 13 industrial customers.

Tin prices for the week: Jan. 23—102.625; Jan. 24—102.75; Jan. 25—102.75; Jan. 28—102.625; Jan. 29—102.50.*

*Estimate.

# Hydraulic Bulldozers *Speed Production*

Ideal for bending, forming or forging operations, The WILLIAMS-WHITE Hydraulic Bulldozer cannot be overloaded. Maximum or pre-set pressure is obtainable at any point in the stroke and inherent dwell at end of each stroke reduces springback of work.

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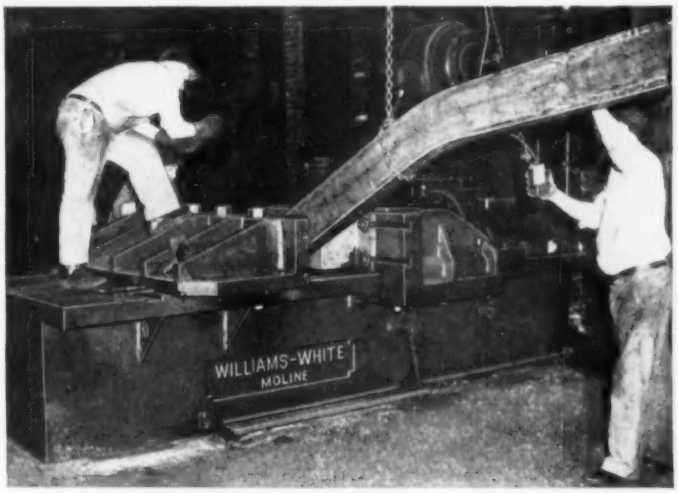


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PAGEL MACH. CO., Milwaukee, Wis.
PERINE MACHRY & SUPPLY CO., Seattle, Wash.
FRANK RYMAN'S SONS, Pittsburgh, Pa.
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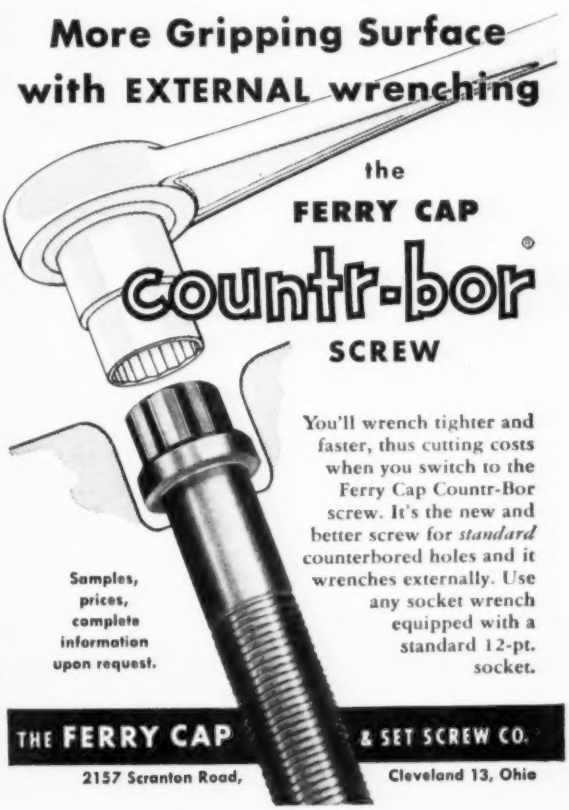
## More Gripping Surface with EXTERNAL wrenching

the
**FERRY CAP**
**Countr-bor®**
**SCREW**



You'll wrench tighter and faster, thus cutting costs when you switch to the Ferry Cap Countr-Bor screw. It's the new and better screw for *standard* counterbored holes and it wrenches externally. Use any socket wrench equipped with a standard 12-pt. socket.

Samples, prices, complete information upon request.

THE FERRY CAP & SET SCREW CO.
2157 Scranton Road, Cleveland 13, Ohio

# Nonferrous Prices *(Effective Jan. 29, 1957)*

## MILL PRODUCTS

*(Cents per lb, unless otherwise noted)*

### ALUMINUM

*(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)*

**Flat Sheet (Mill Finish) and Plate**

*("F" temper except 6061-0)*

| Alloy | .032 | .081 | .136–.249 | .250–3 |
|---|---|---|---|---|
| 1800, 1100, 3003 | 44.3 | 42.1 | 40.9 | 40.2 |
| 5052 | 51.8 | 46.8 | 45.1 | 42.9 |
| 6061-0 | 48.9 | 44.6 | 42.8 | 42.6 |

**Extruded Solid Shapes**

| Factor | 6063 T-5 | 6062 T-6 |
|---|---|---|
| 6–8 | 45.5–47.3 | 61.3–65.1 |
| 12–14 | 46.2–47.7 | 62.2–66.8 |
| 24–26 | 49.4–49.5 | 73.1–77.8 |
| 36–38 | 58.3–59.0 | 97.4–101.0 |

**Screw Machine Stock—2011-T-3**

| Size* | ¼ | ⅜–⅜ | ⅝–1 | 1¼–1½ |
|---|---|---|---|---|
| Price | 59.7 | 58.8 | 57.4 | 55.2 |

**Roofing Sheet, Corrugated**

(Per sheet, 26" wide base, 16,000 lb)

| Length"→ | 72 | 96 | 120 | 144 |
|---|---|---|---|---|
| .019 gage | $1.352 | $1.803 | $2.254 | $2.704 |
| .024 gage | 1.686 | 2.252 | 2.815 | 3.378 |

### MAGNESIUM

*(F.o.b. shipping Pt., carload frt. allowed)*

**Sheet and Plate**

| Type→ Gage→ | .250–3.00 | .250–2.00 | .188 | .081 | .032 |
|---|---|---|---|---|---|
| AZ31B Stand. Grade | | 67.9 | 69.0 | 77.9 | 103.1 |
| AZ31B Spec. | | 93.3 | 95.7 | 108.7 | 171.3 |
| Tread Plate | | 70.6 | 71.7 | | |
| Tooling Plate | 73.0 | | | | |

**Extruded Shapes**

| factor→ | 6-8 | 12-14 | 24-26 | 36-38 |
|---|---|---|---|---|
| Comm. Grade (AZ31C) | 69.6 | 70.7 | 75.6 | 89.2 |
| Spec. Grade (AZ31B) | 84.6 | 85.7 | 90.6 | 104.2 |

**Alloy Ingot**

AZ91B (Die Casting) ... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

### NICKEL, MONEL, INCONEL

*(Base prices, f.o.b. mill)*

| | "A" Nickel | Monel | Inconel |
|---|---|---|---|
| Sheet, CR | 113 | 97 | 118 |
| Strip, CR | 111 | 99 | 128 |
| Rod, bar, HR | 94 | 80 | 99 |
| Angles, HR | 94 | 80 | 99 |
| Plates, HR | 107 | 96 | 111 |
| Seamless tube | 144 | 120 | 190 |
| Shot, blocks | ... | 78 | ... |

### COPPER, BRASS, BRONZE

*(Freight included on 5000 lbs)*

| | Sheet | Wire | Rod | Tube |
|---|---|---|---|---|
| Copper | 58.13 | ..... | 55.36 | 58.32 |
| Brass, 70/30 | 50.19 | 50.73 | 50.13 | 53.10 |
| Brass, Low | 53.40 | 53.94 | 53.34 | 56.21 |
| Brass, R L | 54.54 | 55.08 | 54.48 | 57.35 |
| Brass, Naval | 54.14 | ..... | 48.45 | 57.55 |
| Muntz Metal | 52.19 | ..... | 48.00 | ..... |
| Comm. Bz. | 56.23 | 56.77 | 56.17 | 58.75 |
| Mang. Bz. | 57.88 | ..... | 51.98 | ..... |
| Phos. Bz. 5% | 77.25 | ..... | 77.25 | ..... |

### TITANIUM

*(10,000 lb base, f.o.b. mill)*

**Sheet and strip, commercially pure, $11.00-$12.10; alloy, $14.75; Plate, HR, commercially pure, $9.25-$9.75; alloy, $11.25. Wire, rolled and/or drawn, commercially pure, $8.50-$9.00; alloy, $11.00; Bar, HR or forged, commercially pure, $7.10-$7.35; alloy, $7.10-$7.30; billets, HR, commercially pure, $6.85-$7.10; alloy, $6.85-$7.05.**

## PRIMARY METAL

*(Cents per lb, unless otherwise noted)*

Antimony, American, Laredo, Tex. . 33.50
Beryllium aluminum 5% Be, Dollar per lb contained Be ..... $74.75
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading ..... $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Calcium, 99.9%, small lots ..... $ 4.55
Chromium, 99.8% metallic basis . $ 1.31
Cobalt, 97-99% (per lb) ... $2.35 to $2.42
Germanium, per gm, f.o.b. Miami Okla., refined ..... $48.50-$53.50
Gold, U. S. Treas., per troy oz. ... $35.00
Indium, 99.9% dollars per troy oz. . $ 2.25
Iridium, dollars per troy oz. . $90 to $100
Lithium, 98% ..... $11.00 to $14.00
Magnesium, sticks, 100 to 500 lb .. 59.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $255 to $257
Nickel oxide sinter at Copper Cliff, Ont., contained nickel ..... 71.25
Palladium, dollars per troy oz. $23 to $24
Platinum, dollars per troy oz. $98 to $101
Rhodium ..... $120.00 to $125.00
Silver ingots (¢ per troy oz.) .... 91.375
Thorium, per kg ..... $43.00
Uranium, normal per kg ..... $40.00
Vanadium ..... $ 3.45
Zirconium sponge ..... $10.00

## REMELTED METALS

### Brass Ingot

*(Cents per lb delivered, carloads)*

**85-5-5 ingot**
No. 115 ..... 34.00
No. 120 ..... 32.50
No. 123 ..... 31.00
**80-10-10 ingot**
No. 305 ..... 37.50
No. 315 ..... 35.75
**88-10-2 ingot**
No. 210 ..... 46.25
No. 215 ..... 43.00
No. 245 ..... 38.00
**Yellow ingot**
No. 405 ..... 26.50
**Manganese bronze**
No. 421 ..... 29.75

### Aluminum Ingot

*(Cents per lb del'd 30,000 lb and over)*

95-5 aluminum-silicon alloys
0.30 copper max. ..... 25.00-25.75
0.60 copper max. ..... 24.75-25.50
Piston alloys (No. 122 type) 24.25-25.25
No. 12 alum. (No. 2 grade) ..22.50-23.50
108 alloy ..... 22.50-23.50
195 alloy ..... 24.50-25.75
13 alloy (0.60 copper max.) ...24.75-25.50
AXS-679 ..... 22.50-23.50

**Steel deoxidizing aluminum, notch bar granulated or shot**

Grade 1—95-97½% ..... 23.25-24.00
Grade 2—92-95% ..... 22.25-23.00
Grade 3—90-92% ..... 21.25-22.00
Grade 4—85-90% ..... 20.25-21.00

## SCRAP METALS

### Brass Mill Scrap

*(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)*

| | Heavy | Turnings |
|---|---|---|
| Copper | 32 | 31¼ |
| Yellow brass | 24⅝ | 22⅝ |
| Red brass | 28½ | 27⅝ |
| Comm. bronze | 29½ | 28¾ |
| Mang. bronze | 23½ | 22¼ |
| Yellow brass rod ends | 24⅝ | .... |

### Customs Smelters Scrap

*(Cents per pound carload lots, delivered to refinery)*

No. 1 copper wire ..... 28½
No. 2 copper wire ..... 27
Light copper ..... 24¾
*Refinery brass ..... 25½

*Dry copper content.

### Ingot Makers Scrap

*(Cents per pound carload lots, delivered to refinery)*

No. 1 copper wire ..... 28½
No. 2 copper wire ..... 27
Light copper ..... 24¾
No. 1 composition ..... 26¼
No. 1 comp. turnings ..... 25¾
Hvy. yellow brass solids ..... 18¼
Brass pipe ..... 18¼
Radiators ..... 19¾
*Aluminum*
Mixed old cast. ..... 14½—15
Mixed new clips ..... 15½—16½
Mixed turnings, dry ..... 15 —15½

### Dealer's Scrap

*(Dealers' buying price f.o.b. New York in cents per pound)*

**Copper and Brass**

No. 1 copper wire ..... 25½—26
No. 2 copper wire ..... 24 —24½
Light copper ..... 22½—23
Auto radiators (unsweated) . 17 —17½
No. 1 composition ..... 23½—24
No. 1 composition turnings ... 22 —22½
Cocks and faucets ..... 18 —18½
Clean heavy yellow brass ... 15½—16
Brass pipe ..... 18½—19
New soft brass clippings ... 20½—21
No. 1 brass rod turnings ..... 17½—18

**Aluminum**

Alum. pistons and struts .... 5½— 6
Aluminum crankcases ..... 10½—11
1100 (2S) aluminum clippings 14 —14½
Old sheet and utensils ..... 10½—11
Borings and turnings ..... 7 — 7½
Industrial castings ..... 10½—11
2024 (24S) clippings ..... 12 —12½

**Zinc**

New zinc clippings ..... 6½— 7
Old zinc ..... 4½— 5
Zinc routings ..... 2½— 2¾
Old die cast scrap ..... 2¼— 2½

**Nickel and Monel**

Pure nickle clippings ..... $1.75-$1.85
Clean nickel turnings ..... $1.50-$1.60
Nickel anodes ..... $1.75-$1.85
Nickel rod ends ..... $1.75-$1.85
New Monel clippings ..... 80-85
Clean Monel turnings ..... 75
Old sheet Monel ..... 75-80
Nickel silver clippings, mixed 21
Nickel silver turnings, mixed 18

**Lead**

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 6¾— 7
Batteries, acid free ..... 4 — 4¼

**Miscellaneous**

Block tin ..... 77 —78
No. 1 pewter ..... 61 —62
Auto babbitt ..... 40 —41
Mixed common babbitt ..... 13 —13½
Solder joints ..... 18 —18½
Siphon tops ..... 42
Small foundry type ..... 14¾—15
Monotype ..... 14 —14½
Lino. and stereotype ..... 13 —13½
Electrotype ..... 12½—12¾
Hand picked type shells ..... 9½—10
Lino. and stereo. dross ..... 4¾— 5
Electro. dross ..... 4 — 4¼

IRON AGE

# STEEL PRICES

*(Effective Jan. 29, 1957)*

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

| | | BILLETS, BLOOMS, SLABS | | | PIL-ING | SHAPES STRUCTURALS | | | STRIP | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon Rerolling Net Ton | Carbon Forging Net Ton | Alloy Net Ton | Sheet Steel | Carbon | Hi Str. Low Alloy | Carbon Wide-Flange | Hot-rolled | Cold-rolled | Hi Str H.R. Low Alloy | Hi Str. C.R. Low Alloy | Alloy Hot-rolled | Alloy Cold-rolled |
| EAST | Bethlehem, Pa. | | | $107.00 *B3* | | 5.05 *B3* | 7.40 *B3* | 5.05 *B3* | | | | | | |
| | Buffalo, N. Y. | $74.00 *B3, R3* | $91.50 *B3, R3* | $107.00 *B3, R3* | 5.90 *B3* | 5.05 *B3* | 7.40 *B3* | 5.05 *B3* | 4.675 *B3, R3* | 6.85 *R7* | 6.95 *B3* | | | |
| | Claymont, Del. | | | | | | | | | | | | | |
| | Harrison, N. J. | | | | | | | | | | | | | 14.55 *C11* |
| | Conshohocken, Pa. | | $96.50 *A2* | $114.00 *A2* | | | | | 4.725 *A2* | 6.90 *A2* | 6.95 *A2* | | | |
| | New Bedford, Mass. | | | | | | | | | 7.30 *R6* | | | | |
| | Johnstown, Pa. | $74.00 *B3* | $91.50 *B3* | $107.00 *B3* | | 5.05 *B3* | 7.40 *B3* | | | | | | | |
| | Boston, Mass. | | | | | | | | | 7.40 *T8* | | | | 14.90 *T8* |
| | New Haven, Conn. | | | | | | | | | 7.30 *D1* | | | | |
| | Baltimore, Md. | | | | | | | | | 6.85 *T8* | | | | |
| | Phoenixville, Pa. | | | | | 5.85 *P2* | | 5.85 *P2* | | | | | | |
| | Sparrows Pt., Md. | | | | | | | | 4.675 *B3* | | 6.95 *B3* | | | |
| | Bridgeport, Wallingford, Conn. | $79.00 *N8* | $96.50 *N8* | $107.00 *N8* | | | | | | 7.30 *W1* 6.95 *N8* | | | | |
| | Pawtucket, R. I. Worcester, Mass. | | | | | | | | | 7.48 *A5,N7* | | | | 14.90 *N7* |
| MIDDLE WEST | Alton, Ill. | | | | | | | | 4.875 *L1* | | | | | |
| | Ashland, Ky. | | | | | | | | 4.675 *A7* | | | | | |
| | Canton-Massillon, Dover, Ohio | | $94.00 *R3* | $107.00 *R3, T5* | | | | | | 6.85 *G4* | | 10.10 *G4* | | 14.55 *G4* |
| | Chicago, Ill. Franklin Park, Ill. | $74.00 *U1, R3* | $91.50 *U1, R3,W8* | $107.00 *U1, R3,W8* | 5.90 *U1* | 5.00 *U1, W8* | 7.35 *U1, Y1* 6.00 *W8* | 5.00 *U1* | 4.675 *N4* 4.675 *A1* | 6.95 *A1,T8* | | | 7.75 *W8 S9* | 14.55 *A1, S9,T8* |
| | Cleveland, Ohio | | | | | | | | | 6.85 *A5,J3* | | | 7.75 *J3* | |
| | Detroit, Mich. | | | $107.00 *R5* | | | | | 4.775 *G3, M2* | 6.95 *M2,G3, D2,P11* | 7.05 *G3* | 10.10 *G3, D2* | 7.75 *G3* | |
| | Anderson, Ind. | | | | | | | | | 6.85 *G4* | | 10.10 *G4* | | |
| | Duluth, Minn. | | | | | | | | | | | | | |
| | Gary, Ind. Harbor, Indiana | $74.00 *U1* | $91.50 *U1* | $107.00 *U1, Y1* | 5.90 *I3* | 5.00 *U1* | 7.35 *U1,I3* | 5.25 *I3* | 4.675 *U1, I3,Y1* | 6.85 *Y1* | 6.95 *U1, I3,Y1* | 10.28 *Y1* | 7.75 *U1, Y1* | |
| | Sterling, Ill. | $74.00 *N4* | | | | | | | 4.775 *N4* | | | | | |
| | Indianapolis, Ind. | | | | | | | | | 7.00 *C5* | | | | |
| | Newport, Ky. | | | | | | | | | | | | 7.75 *A9* | |
| | Middletown, Ohio | | | | | | | | | | | | | |
| | Niles, Warren, Ohio Sharon, Pa. | | $91.50 *S1, C10* | $107.00 *S1, C10* | | | | | 4.675 *S1, R3* | 6.85 *T4* | 6.95 *S1, R3* | 10.00 *S1, R3* | 7.75 *S1* | 14.55 *S1* |
| | Pittsburgh, Pa. Midland, Pa. Butler, Pa. | $74.00 *U1* | $91.50 *U1, C11* | $107.00 *U1, C11* | 5.90 *U1* | 5.00 *U1, J3* | 7.35 *U1, J3* | 5.00 *U1* | 4.675 *P6* | 5.750 *P6* 6.85 *J3,B4, S7* | | | 7.75 *S9* | 14.55 *S9* |
| | Portsmouth, Ohio | | | | | | | | | | | | | |
| | Weirton, Wheeling, Follansbee, W. Va. | | | | | 5.00 *W3* | | | 4.675 *W3* | 6.85 *W3,F3* | 6.95 *W3* | 9.65 *W3* | | |
| | Youngstown, Ohio | $74.00 *R3* | $91.50 *Y1, C10* | $107.00 *Y1* | | 5.00 *Y1* | 7.35 *Y1* | | 4.675 *U1, Y1* | 6.85 *Y1,C5* | 6.95 *U1, Y1* | 10.28 *Y1* | 7.75 *U1, Y1* | |
| WEST | Fontana, Cal. | $83.50 *K1* | $101.00 *K1* | $128.00 *K1* | | 5.75 *K1* | 8.10 *K1* | 5.90 *K1* | 5.525 *K1* | 8.70 *K1* | | | | |
| | Geneva, Utah | $91.50 *C7* | | | | 5.00 *C7* | 7.35 *C7* | | | | | | | |
| | Kansas City, Mo. | | | | | 5.10 *S2* | 7.45 *S2* | | 4.925 *S2* | | 7.20 *S2* | | | |
| | Los Angeles, Torrance, Cal. | | $101.00 *B2* | $127.00 *B2* | | 5.70 *C7, B2* | 8.05 *B2* | | 5.425 *B2, C7* | 8.80 *C1* | | | 8.95 *B2* | |
| | Minnequa, Colo. | | | | | 5.30 *C6* | | | 5.775 *C6* | | | | | |
| | Portland, Ore. | | | | | 5.75 *O2* | | | | | | | | |
| | San Francisco, Niles, Pittsburg, Cal. | | $101.00 *B2* | | | 5.65 *B2* | 8.00 *B2* | | 5.425 *C7,B2* | | | | | |
| | Seattle, Wash. | | $105.00 *B2* | | | 5.75 *B2* | 8.10 *B2* | | 5.675 *B2* | | | | | |
| SOUTH | Atlanta, Ga. | | | | | | | | 4.875 *A8* | | | | | |
| | Fairfield, Ala. City, Birmingham, Ala. | $74.00 *T2* | $91.50 *T2* | | | 5.30 *T2,R3* 5.30 *C16* | 7.35 *T2* | | 4.675 *T2,R3* 4.975 *C10* | | 6.95 *T2* | | | |
| | Houston, Lone Star, Texas | $80.00 *L3* | $96.50 *S2* | $112.00 *S2* | | 5.10 *S2* | 7.45 *S2* | | 4.925 *S2* | | 7.20 *S2* | | | |

IRON AGE

# STEEL PRICES

*(Effective Jan. 29, 1957)*

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

| | | SHEETS | | | | | | | | | WIRE ROD | TINPLATE† | | BLACK PLATE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hot rolled 18 ga. & hvyr. | Cold-rolled | Galvanized | Enameling | Long Terne | Hi Str. Low Alloy H.R. | H Str. Low Alloy C.R. | Hi Str. Low Alloy Galv. | Hot-rolled 19 ga. | | Cokes* 1.25-lb. base box | Electro* 0.25-lb. base box | Holloware Enameling 29 ga. |
| EAST | Bethlehem, Pa. | | | | | | | | | | | | | |
| | Buffalo, N. Y. | 4.675 *B3* | 5.75 *B3* | | | | 6.90 *B3* | 8.525 *B3* | | | 5.80 *W6* | † Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢. | | |
| | Claymont, Del. | | | | | | | | | | | | | |
| | Coatesville, Pa. | | | | | | | | | | | | | |
| | Conshohocken, Pa. | 4.725 *A2* | 5.80 *A2* | | | | 6.95 *A2* | | | | | | | |
| | Harrisburg, Pa. | | | | | | | | | | | | | |
| | Hartford, Conn. | | | | | | | | | | | | | |
| | Johnstown, Pa. | | | | | | | | | | 5.80 *B3* | | | |
| | Fairless, Pa. | 4.725 *U1* | 5.80 *U1* | | | | 6.95 *U1* | 8.575 *U1* | | | | $9.80 *U1* | $8.50 *U1* | |
| | New Haven Conn. | | | | | | | | | | | | | |
| | Phoenixville, Pa. | | | | | | | | | | | | | |
| | Sparrows Pt., Md. | 4.675 *B3* | 5.75 *B3* | 6.30 *B3* | | | 6.90 *B3* | 8.575 *B3* | 9.275 *B3* | | 5.90 *B3* | $9.80 *B3* | $8.50 *B3* | |
| | Worcester, Mass. | | | | | | | | | | 6.10 *A5* | | | |
| | Trenton, N. J. | | | | | | | | | | | | | |
| MIDDLE WEST | Alton, Ill. | | | | | | | | | | 6.00 *L1* | | | |
| | Ashland, Ky. | 4.675 *A7* | | 6.30 *A7* | 6.325 *A7* | | | | | | | | | |
| | Canton-Massillon, Dover, Ohio | | | 6.30 *R3,R1* | | | | | | | | | | |
| | Chicago, Joliet, Ill. | 4.675 *W8, A1* | | | | | 6.90 *U1* | | | 5.80 *K2* | 5.80 *A5,R3, N4,W8,K2* | | | |
| | Sterling, Ill. | | | | | | | | | | 5.90 *N4, K2* | | | |
| | Cleveland, Ohio | 4.675 *J3, R3* | 5.75 *J3, R3* | | 6.325 *R3* | | 6.90 *R3* | 8.525 *R3, J3* | | | 5.80 *A5* | | | |
| | Detroit, Mich. | 4.775 *G3, M2* | 5.85 *G3* 5.75 *M2* | | | | 7.00 *G2* | 8.625 *G3* | | | | | | |
| | Newport, Ky. | 4.675 *A9* | 5.75 *A9* | | | | | | | | | | | |
| | Gary, Ind. Harbor, Indiana | 4.675 *U1, I3,Y1* | 5.75 *U1, I3,Y1* | 6.30 *U1, I3* | 6.325 *U1, I3,Y1* | 6.70 *U1* | 6.90 *U1, Y1,I3* | 8.525 *U1, Y1* | | | 5.80 *Y1* | $9.70 *U1, Y1* | $8.40 *I3, U1,Y1* | 7.15 *U1, Y1* |
| | Granite City, Ill. | 4.875 *G2* | 5.95 *G2* | 6.50 *G2* | 6.525 *G2* | | | | | | | | $8.50 *G2* | 7.25 *G2* |
| | Kokomo, Ind. | | | 6.40 *C9* | | | | | | | 5.90 *C9* | | | |
| | Mansfield, Ohio | | 5.75 *E2* | | | 6.70 *E2* | | | | | | | | |
| | Middletown, Ohio | | 5.75 *A7* | 6.30 *A7* | 6.325 *A7* | 6.70 *A7* | | | | | | | | |
| | Niles, Warren, Ohio Sharon, Pa. | 4.675 *S1, R3,N3* | 5.75 *R3* | 6.30 *R3* | 6.325 *N3* | 6.70 *N3* | 6.90 *S1, R3* | 8.525 *S1, R3* | | | | | $8.40 *R3* | |
| | Pittsburgh, Pa. Midland, Pa. Butler, Pa. | 4.675 *U1, J3,P6* | 5.75 *U1, J3,P6* | 6.30 *U1, J3* | 6.325 *U1* | | 6.90 *U1, J3,R3* | 8.525 *U1, J3* | 9.275 *U1* | | 5.80 *A5, P6,J3* | $9.70 *J3, U1* | $8.40 *U1, J3* | 7.15 *U1, J3* |
| | Portsmouth, Ohio | 4.675 *P7* | 5.75 *P7* | | | | | | | | 5.80 *P7* | | | |
| | Weirton, Wheeling, Follansbee, W. Va. | 4.675 *W3, W5* | 5.75 *W3, W5,F3* | 6.30 *W3, W5* | | 6.70 *W3, W5* | 6.90 *W3* | 8.525 *W3* | | | | $9.70 *W5* | $8.40 *W5* | 7.15 *W5* 7.40 *W3* |
| | Youngstown, Ohio | 4.675 *U1, Y1* | 5.75 *Y1* | | 6.325 *Y1* | | 6.90 *Y1* | 8.525 *Y1* | | | 5.80 *Y1* | | | 7.15 *Y1* |
| WEST | Fontana, Cal. | 5.525 *K1* | 7.00 *K1* | | | | 7.75 *K1* | 9.775 *K1* | | | | $10.45 *K1* | $9.15 *K1* | |
| | Geneva, Utah | 4.775 *C7* | | | | | | | | | | | | |
| | Kansas City, Mo. | | | | | | | | | | 6.05 *S2* | | | |
| | Los Angeles, Torrance, Cal. | | | | | | | | | | 6.60 *B2* | | | |
| | Minnequa, Colo. | | | | | | | | | | 6.05 *C6* | | | |
| | San Francisco, Niles, Pittsburg, Cal. | 5.375 *C7* | 6.70 *C7* | 7.05 *C7* | | | | | | | 6.45 *C7* | $10.45 *C7* | $9.15 *C7* | |
| | Seattle, Wash. | | | | | | | | | | | | | |
| SOUTH | Atlanta, Ga. | | | | | | | | | | | | | |
| | Fairfield, Ala. Alabama City, Ala. | 4.675 *T2, R3* | 5.75 *T2,* | 6.30 *T2, R3* | | | | | | | 5.80 *T2,R3* | $9.80 *T2* | $8.50 *T2* | |
| | Houston, Tex. | | | | | | | | | | 6.05 *S2* | | | |

IRON AGE

# STEEL PRICES

*(Effective Jan. 29, 1957)*

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

| | | BARS | | | | | | PLATES | | | | WIRE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Carbon† Steel | Reinforcing | Cold Finished | Alloy Hot-rolled | Alloy Cold Drawn | Hi Str. H.R. Low Alloy | Carbon Steel | Floor Plate | Alloy | Hi Str. Low Alloy | Mfr's. Bright |
| EAST | Bethlehem, Pa. | | | | 6.125 *B3* | 8.325 *B3* | 7.40 *B3* | | | | | |
| | Buffalo, N. Y. | 5.075 *B3,R3* | 5.075 *B3,R3* | 6.90 *B5* | 6.125 *B3,R3* | 8.325 *B5,B3* | 7.40 *B3* | 4.85 *B3* | | | | 7.20 *W6* |
| | Claymont, Del. | | | | | | | 5.70 *C4* | | 6.85 *C4* | 7.55 *C4* | |
| | Coatesville, Pa. | | | | | | | 5.25 *L4* | | 6.85 *L4* | 7.55 *L4* | |
| | Conshohocken, Pa. | | | | | | | 4.95 *A2* | 5.925 *A2* | 6.85 *A2* | 7.25 *A2* | |
| | Harrisburg, Pa. | | | | | | | 5.80 *P2* | 6.275 *P2* | | | |
| | Hartford, Conn. | | | 7.35 *R3* | | 8.625 *R3* | 7.40 *B3* | | | | | |
| | Johnstown, Pa. | 5.075 *B3* | 5.075 *B3* | | 6.125 *B3* | | | 4.85 *B3* | | 6.85 *B3* | 7.25 *B3* | 7.20 *B3* |
| | Fairless, Pa. | 5.225 *U1* | 5.225 *U1* | | 6.275 *U1* | | | | | | | |
| | Newark, N. J. | | | 7.30 *W10* | | 8.50 *W10* | | | | | | |
| | Camden, N. J. | | | 7.30 *P10* | | 8.50 *P10* | | | | | | |
| | Bridgeport, Conn. Putnam, Conn. | 5.30 *N8* | 5.30 *N8* | 7.20 *N8* 7.40 *W10* | 6.20 *N8* | 8.475 *N8* | 7.50 *N8* | | | | | |
| | Sparrows Pt., Md. | | 5.075 *B3* | | | | | 4.85 *B3* | | 6.85 *B3* | 6.85 *B3* | 7.30 *B3* |
| | Palmer, Worcester, Readville, Mass. Milton, Pa. | 5.225 *M7* | 5.225 *M7* | 7.40 *B5,C14* | | 8.325 *A5* 8.625 *B5* | | | | | | 7.50 *A5,W6* 9.025 *T8* |
| | Spring City, Pa. | | | 7.30 *K4* | | 8.50 *K4* | | | | | | |
| MIDDLE WEST | Alton, Ill. | 5.275 *L1* | | | | | | | | | | 7.40 *L1* |
| | Ashland, Newport, Ky | | | | | | | 4.85 *A7,A9* | | 6.85 *A9* | | |
| | Canton, Massillon, Ohio | | | 6.85 *R3,R2* | 6.125 *R3,T5* | 8.325 *R3,R2, T5* | | | | | | |
| | Chicago, Joliet, Ill. | 5.075 *U1,R3, W8,N4* 5.575 *P13* | 5.075 *U1,R3, N4* 5.575 *P13* | 6.85 *A5,B5, W10,L2 W8,N9* | 6.125 *U1,R3, W8* | 8.325 *A5,B5, W8,L2,N9, W10* | 5.875 *W8* | 4.85 *U1,I3, W8,A1* | 5.925 *U1* | 6.85 *U1,W8* | 7.25 *U1* | 7.20 *A5,K2 R3,N4,W7* |
| | Cleveland, Ohio | 5.075 *R3* | 5.075 *R3* | 6.85 *A5,C13* | | 8.325 *A5,C13* | 7.425 *R3* | 4.95 *J3,R3* | 5.925 *J3* | | 7.25 *J3,R3* | 7.20 *A5, C13* |
| | Detroit, Mich. | 5.175 *G3* | 5.425 *G3* | 7.05 *B5,P8* 7.10 *P3* 6.85 *R5* | 6.225 *G3* 6.125 *R5* | 8.525 *B5,P3, P8* 8.325 *R5* | 7.525 *G3* | 4.95 *G3* | | 6.90 *G3* | | |
| | Duluth, Minn. | | | | | | | | | | | 7.20 *A5* |
| | Gary, Ind. Harbor, Crawfordsville | 5.075 *U1,I3, Y1* | 5.075 *U1,I3, Y1* | 6.85 *R3,M5* | 6.125 *U1,I3, Y1* | 8.325 *R3,M4* | 7.425 *U1,I3, Y1* | 4.85 *U1,I3, Y1* | 5.925 *I3* | 6.85 *U1,Y1* | 7.25 *U1,Y1* | 7.30 *M4* |
| | Granite City, Ill. | | | | | | | 5.05 *G2* | | | | |
| | Kokomo, Ind. | | | | | | | | | | | 7.30 *C9* |
| | Sterling, Ill. | 5.525 *N4* | 5.175 *N4* | | | | | | | | | 7.30 *K2* |
| | Niles, Warren, Ohio Sharon, Pa. | | | 6.85 *C10* | 6.125 *C10,S1* | 8.325 *C10* | 7.425 *S1* | 4.85 *S1,R3* | | 6.85 *S1* | 7.25 *S1,R3* | |
| | Pittsburgh, Pa. Midland, Pa. | 5.075 *U1, C11,J3* | 5.075 *U1,J3* | 6.85 *A5,C8, J3,R3,S9, B4,W10,C11* | 6.125 *U1, C11,J3* | 8.325 *A5,R3, S9,C8,W10, C11* | 7.425 *U1,J3* | 4.85 *U1,J3* | 5.925 *U1* | 6.85 *U1,J3* | 7.25 *U1,J3* | 7.20 *A5,J3, P6* |
| | Portsmouth, Ohio | | | | | | | | | | | 7.20 *P7* |
| | Weirton, Wheeling, Follansbee, W. Va. | | | | | | | 4.85 *W5* | | | | |
| | Youngstown, Ohio | 5.075 *U1, Y1,R3* | 5.075 *U1, Y1,R3* | 6.85 *U1,Y1, F2* | 6.125 *U1,Y1* | 8.325 *Y1,F2* | 7.425 *U1,Y1,* | 4.85 *U1,Y1, R3* | | 6.85 *Y1* | 7.25 *Y1* | 7.20 *Y1* |
| WEST | Emeryville, Cal. | 5.825 *J5* | 5.825 *J5* | | | | | | | | | |
| | Fontana, Cal. | 6.025 *K1* | 6.025 *K1* | | 7.175 *K1* | | 8.125 *K1* | 5.60 *K1* | | 7.60 *K1* | 8.00 *K1* | |
| | Geneva, Utah | 5.175 *C7* | | | | | | 4.85 *C7* | | | 7.25 *C7* | |
| | Kansas City, Mo. | 5.325 *S2* | 5.325 *S2* | | 6.375 *S2* | | 7.675 *S2* | | | | | 7.45 *S2* |
| | Los Angeles, Torrance, Cal. | 5.775 *C7,B2* | 5.775 *C7,B2* | 8.30 *R3,P14* | 7.175 *B2* | 10.10 *P14* | 8.125 *B2* | | | | | 8.15 *B2* |
| | Minnequa, Colo. | 5.525 *C6* | 5.525 *C6* | | | | | 5.70 *C6* | | | | 7.45 *C6* |
| | Portland, Ore. | 5.825 *O2* | 5.825 *O2* | | | | | | | | | |
| | San Francisco, Niles, Pittsburg, Cal. | 5.775 *C7* 5.825 *B2* 6.025 *P9* | 5.775 *C7* 5.825 *B2* 6.025 *P9* | | | | 8.175 *B2* | | | | | 8.15 *C7,C6* |
| | Seattle Wash. | 5.825 *B2 N6* | 5.825 *B2* | | | | 8.175 *B2* | 5.75 *B2* | | 7.75 *B2* | 8.15 *B2* | |
| SOUTH | Atlanta, Ga. | 5.575 *A8* | | | | | | | | | | 7.40 *A8* |
| | Fairfield, Ala. City, Birmingham, Ala. | 5.075 *T2,R3* 5.375 *C16* | 5.075 *T2,R3* 5.375 *C16* | | | | 7.425 *T2* | 4.85 *T2,R3* | | | 7.25 *T2* | 7.20 *T2,R3* |
| | Houston, Ft. Worth, Lone Star, Tex. | 5.325 *S2* | 5.325 *S2* | | 6.375 *S2* | | 7.675 *S2* | 4.95 *S2* 5.20 *L3* | | 6.95 *S2* | 7.35 *S2* | 7.45 *S2* |

† Merchant Quality—Specialty Quality 35¢ higher.

# Steel Prices *(Effective Jan. 29, 1957)*

## Key to Steel Producers

### With Principal Offices

*A1* Acme Steel Co., Chicago
*A2* Alan Wood Steel Co., Conshohocken, Pa.
*A3* Allegheny Ludlum Steel Corp., Pittsburgh
*A4* American Cladmetals Co., Carnegie, Pa.
*A5* American Steel & Wire Div., Cleveland
*A6* Angel Nail & Chaplet Co., Cleveland
*A7* Armco Steel Corp., Middletown, Ohio
*A8* Atlantic Steel Co., Atlanta, Ga.
*A9* Acme-Newport Steel Co., Newport, Ky.

*B1* Babcock & Wilcox Tube Div., Beaver Falls, Pa.
*B2* Bethlehem Pacific Coast Steel Corp., San Francisco
*B3* Bethlehem Steel Co., Bethlehem, Pa.
*B4* Blair Strip Steel Co., New Castle, Pa.
*B5* Bliss & Laughlin, Inc., Harvey, Ill.
*B6* Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

*C1* Calstrip Steel Corp., Los Angeles
*C2* Carpenter Steel Co., Reading, Pa.
*C3* Central Iron & Steel Co., Harrisburg, Pa.
*C4* Claymont Products Dept., Claymont, Del
*C5* Cold Metals Products Co., Youngstown, O.
*C6* Colorado Fuel & Iron Corp., Denver
*C7* Columbia Geneva Steel Div., San Francisco
*C8* Columbia Steel & Shafting Co., Pittsburgh
*C9* Continental Steel Corp., Kokomo, Ind.
*C10* Copperweld Steel Co., Pittsburgh, Pa.
*C11* Crucible Steel Co. of America, Pittsburgh
*C12* Cumberland Steel Co., Cumberland, Md.
*C13* Cuyahoga Steel & Wire Co., Cleveland
*C14* Compressed Steel Shafting Co., Readville, Mass.
*C15* G. O. Carlson, Inc., Thorndale, Pa.
*C16* Connors Steel Div., Birmingham
*C17* Chester Blast Furnace, Inc., Chester, Pa.

*D1* Detroit Steel Corp., Detroit
*D2* Dearborn Div., Sharon Steel Corp.
*D3* Driver Harris Co., Harrison, N. J.
*D4* Dickson Weatherproof Nail Co., Evanston, Ill.
*D5* Henry Disston Div., Philadelphia

*E1* Eastern Stainless Steel Corp., Baltimore
*E2* Empire Steel Co., Mansfield, O.

*F1* Firth Sterling, Inc., McKeesport, Pa.
*F2* Fitzsimons Steel Corp., Youngstown
*F3* Follansbee Steel Corp., Follansbee, W. Va.
*G2* Granite City Steel Co., Granite City, Ill.
*G3* Great Lakes Steel Corp., Detroit
*G4* Greer Steel Co., Dover, O.

*H1* Hanna Furnace Corp., Detroit

*I2* Ingersoll Steel Div., Chicago
*I3* Inland Steel Co., Chicago
*I4* Interlake Iron Corp., Cleveland

*J1* Jackson Iron & Steel Co., Jackson, O
*J2* Jessop Steel Corp., Washington, Pa.
*J3* Jones & Laughlin Steel Corp., Pittsburgh
*J4* Joslyn Mfg. & Supply Co., Chicago
*J5* Judson Steel Corp., Emeryville, Calif.

*K1* Kaiser Steel Corp., Fontana, Cal.
*K2* Keystone Steel & Wire Co., Peoria
*K3* Koppers Co., Granite City, Ill.
*K4* Keystone Drawn Steel Co., Spring City, Pa.

*L1* Laclede Steel Co., St. Louis
*L2* La Salle Steel Co., Chicago
*L3* Lone Star Steel Co., Dallas
*L4* Lukens Steel Co., Coatesville, Pa.

*M1* Mahoning Valley Steel Co., Niles, O.
*M2* McLouth Steel Corp., Detroit
*M3* Mercer Tube & Mfg. Co., Sharon, Pa.
*M4* Mid-States Steel & Wire Co., Crawfordsville, Ind.
*M5* Monarch Steel Div., Hammond, Ind.
*M6* Mystic Iron Works, Everett, Mass.
*M7* Milton Steel Products Div., Milton, Pa.

*N1* National Supply Co., Pittsburgh
*N2* National Tube Div., Pittsburgh
*N3* Niles Rolling Mill Div., Niles, O.
*N4* Northwestern Steel & Wire Co., Sterling, Ill.
*N6* Northwest Steel Rolling Mills, Seattle
*N7* Newman Crosby Steel Co., Pawtucket, R. I.
*N8* Northeastern Steel Corp., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

*O1* Oliver Iron & Steel Co., Pittsburgh
*O2* Oregon Steel Mills, Portland

*P1* Page Steel & Wire Div., Monessen, Pa.
*P2* Phoenix Iron & Steel Co., Phoenixville, Pa.
*P3* Pilgrim Drawn Steel Div., Plymouth, Mich.
*P4* Pittsburgh Coke & Chemical Co., Pittsburgh
*P5* Pittsburgh Screw & Bolt Co., Pittsburgh
*P6* Pittsburgh Steel Co., Pittsburgh
*P7* Portsmouth Div., Detroit Steel Corp., Detroit
*P8* Plymouth Steel Co., Detroit
*P9* Pacific States Steel Co., Niles, Ca.
*P10* Precision Drawn Steel Co., Camden,
*P11* Production Steel Strip Corp., Detroit
*P13* Phoenix Mfg. Co., Joliet, Ill.
*P14* Pacific Tube Co.

*R1* Reeves Steel & Mfg. Co., Dover, O.
*R2* Reliance Div., Eaton Mfg. Co., Massillon, O.
*R3* Republic Steel Corp., Cleveland
*R4* Roebling Sons Co., John A. Trenton, N. J.
*R5* Rotary Electric Steel Co., Detroit
*R6* Rodney Metals, Inc., New Bedford, Mass.
*R7* Rome Strip Stee Co., Rome, N. Y

*S1* Sharon Steel Corp., Sharon, Pa.
*S2* Sheffield Steel Div., Kansas City
*S3* Shenango Furnace Co., Pittsburgh
*S4* Simonds Saw and Steel Co., Fitchburg, Mass.
*S5* Sweet's Steel Co., Williamsport, Pa.
*S6* Standard Forging Corp., Chicago
*S7* Stanley Works, New Britain, Conn.
*S8* Superior Drawn Steel Co., Monaca, Pa.
*S9* Superior Steel Corp., Carnegie, Pa.
*S10* Seneca Steel Service, Buffalo

*T1* Tonawanda Iron Div., N. Tonawanda, N. Y.
*T2* Tennessee Coal & Iron Div., Fairfield
*T3* Tennessee Products & Chem. Corp., Nashville
*T4* Thomas Strip Div., Warren, O.
*T5* Timken Steel & Tube Div., Canton, O.
*T7* Texas Steel Co., Fort Worth
*T8* Thompson Wire Co., Boston

*U1* United States Steel Corp., Pittsburgh
*U2* Universal-Cyclops Steel Corp., Bridgeville, Pa.
*U3* Ulbrich Stainless Steels, Wallingford, Conn.
*U4* U. S. Pipe & Foundry Co., Birmingham

*W1* Wallingford Steel Co., Wallingford, Conn.
*W2* Washington Steel Corp., Washington, Pa.
*W3* Weirton Steel Co., Weirton, W. Va.
*W4* Wheatland Tube Co., Wheatland, Pa.
*W5* Wheeling Steel Corp., Wheeling, W. Va.
*W6* Wickwire Spencer Steel Div., Buffalo
*W7* Wilson Steel & W re Co., Chicago
*W8* Wisconsin Steel Div., S. Chicago, Ill.
*W9* Woodward Iron Co., Woodward, Ala.
*W10* Wycoff Steel Co., Pittsburgh
*W12* Wallace Barnes Steel Div., Bristol, Conn.

*Y1* Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

**Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.**

| STANDARD T. & C. | BUTTWELD | | | | | | | | | | | | | | SEAMLESS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ½ In. | | ¾ In. | | 1 In. | | 1¼ In. | | 1½ In. | | 2 In. | | 2½–3 In. | | 2 In. | | 2½ In. | | 3 In. | | 3½–4 In. | |
| | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk. | Gal. | Blk | Gal. | Blk. | Ga. | Blk. | Ga. | Blk | Gal. | Blk. | Gal. | Blk. | Gal. |
| Sparrows Pt. *B3* | 10.50 | +4.75 | 13.50 | +0.75 | 16.00 | 2.75 | 18.50 | 3.50 | 19.00 | 4.50 | 19.50 | 5.00 | 21.00 | 4.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Youngstown *R3* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Fontana *K1* | +0.50 | +19.75 | 2.50 | +15.75 | 5.00 | +12¾ | 7.50 | +10.5 | 8.00 | +9.50 | 8.50 | +9.00 | 10.00 | +8.25 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Pittsburgh *J3* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | +2.00 | +17 | 4.50 | +12.25 | 7.00 | +9.75 | 8.50 | +8.25 |
| Alton, Ill. *L1* | 10.50 | +4.75 | 13.50 | +0.75 | 16.00 | 2.75 | 18.50 | 3.50 | 19.00 | 4.50 | 19.50 | 5.00 | 21.00 | 4.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sharon *M3* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Fairless *N2* | 10.50 | +4.75 | 13.50 | +0.75 | 16.00 | 2.75 | 18.50 | 3.50 | 19.00 | 4.50 | 19.50 | 5.00 | 21.00 | 4.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Pittsburgh *N1* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | +2.00 | +17 | 4.50 | +12.25 | 7.00 | +9.75 | 8.50 | +8.25 |
| Wheeling *W5* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Wheatland *W4* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Youngstown *Y1* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | +2.0 | +17 | 4.50 | +12.25 | 7.00 | +9.75 | 8.50 | +8.25 |
| Indiana Harbor *Y1* | 11.50 | +5.75 | 14.50 | 1.25 | 17.00 | 3.75 | 19.50 | 4.50 | 20.00 | 5.50 | 20.50 | 6.00 | 22.00 | 5.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lorain *N2* | 12.50 | +2.75 | 15.50 | 1.25 | 18.00 | 4.75 | 20.50 | 5.50 | 21.00 | 6.50 | 21.50 | 7.00 | 23.00 | 6.75 | +2.00 | +17 | 4.50 | +12.25 | 7.00 | +9.75 | 8.50 | +8.25 |
| EXTRA STRONG PLAIN ENDS | | | | | | | | | | | | | | | | | | | | | | |
| Sparrows Pt. *B3* | 15.00 | 1.25 | 19.00 | 5.25 | 21.00 | 8.75 | 21.50 | 7.50 | 22.00 | 8.50 | 22.50 | 9.00 | 23.00 | 7.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Youngstown *R3* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Fairless *N2* | 15.00 | 1.25 | 19.00 | 5.25 | 21.00 | 8.75 | 21.50 | 7.50 | 22.00 | 8.50 | 22.50 | 9.00 | 23.00 | 7.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Fontana *K1* | 4.00 | ..... | 8.00 | ..... | 10.00 | ..... | 10.50 | ..... | 11.00 | ..... | 11.50 | ..... | 12 00 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Pittsburgh *J3* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | +0.50 | +14.50 | 7.00 | +8.75 | 9.50 | +6.25 | 14.50 | +1.25 |
| Alton, Ill. *L1* | 15.00 | 1.25 | 19.00 | 5.25 | 21.00 | 8.75 | 21.50 | 7.50 | 22.00 | 8.50 | 22.50 | 9.00 | 23.00 | 7.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Sharon *M3* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Pittsburgh *N1* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | +0.50 | +14.50 | 7.00 | +8.75 | 9.50 | +6.25 | 14.50 | +1.25 |
| Wheeling *W5* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Wheatland *W4* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Youngstown *Y1* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | +0.50 | +14.50 | 7.00 | +8.75 | 9.50 | +6.25 | 14.50 | +1.25 |
| Indiana Harbor *Y1* | 16.00 | 2.25 | 20.00 | 6.25 | 22.00 | 9.75 | 22.50 | 8.50 | 23.00 | 9.50 | 23.50 | 10.00 | 24.00 | 8.75 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Lorain *N2* | 17.00 | 3.25 | 21.00 | 7.25 | 23.00 | 10.75 | 23.50 | 9.75 | 24.00 | 10.50 | 24.50 | 11.00 | 25.00 | 9.75 | +0.50 | +14.50 | 7.00 | +8.75 | 9.50 | +6.25 | 14.50 | +1.25 |

Threads only, buttweld and seamless 2¼ pt. higher discount Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb

## TOOL STEEL

*F.o.b. mill*

| W | Cr | V | Mo | Co | per lb | SAE |
|---|---|---|---|---|---|---|
| 18 | 4 | 1 | — | — | $1.68 | T-1 |
| 18 | 4 | 1 | — | 5 | 2.385 | T-4 |
| 18 | 4 | 2 | — | — | 1.185 | T-2 |
| 1.5 | 4 | 1.5 | 8 | — | 1.04 | M-1 |
| 6 | 4 | 3 | 6 | — | 1.43 | M-3 |
| 6 | 4 | 2 | 5 | — | 1.185 | M-2 |

| | |
|---|---|
| High-carbon chromium | .83 D-3, D-5 |
| Oil hardened manganese | .45 O-2 |
| Special carbon | .41 W-1 |
| Extra carbon | .345 W-1 |
| Regular carbon | .29 W-1 |

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

## CLAD STEEL

Base prices, cents per lb f.o.b.

| | Cladding | Plate (*A3, J2, L4*) 10 pct | Plate (*A3, J2, L4*) 15 pct | Plate (*A3, J2, L4*) 20 pct | Sheet (*I2*) 20 pct |
|---|---|---|---|---|---|
| Stainless Type | 347 | | | | 33.25 |
| | 304 | 34.60 | 38.00 | 41.50 | 35.25 |
| | 316 | 39.70 | 43.20 | 46.65 | 52.25 |
| | 321 | 36.35 | 39.80 | 43.50 | 42.00 |
| | 347 | 39.50 | 43.95 | 48.45 | 51.00 |
| | 405 | 29.20 | 33.15 | 37.05 | |
| | 410, 430 | 28.70 | 32.65 | 36.55 | |

CR Strip (S9) Copper, 10 pct, 2 sides, 40.85; 1 side, 33.50.

## ELECTRICAL SHEETS

| 22-Gage F.o.b. Mill Cents Per Lb | Hot-Rolled (Cut Lengths)* | Cold-Reduced (Coiled or Cut Length) Semi-Processed | Cold-Reduced (Coiled or Cut Length) Fully Processed |
|---|---|---|---|
| Field | 9.90 | 9.20 | |
| Armature | 10.35 | 10.35 | 10.85 |
| Elect. | 11.00 | 11.025 | 11.525 |
| Meter | 12.05 | 12.075 | 12.575 |
| Dynamo | 13.05 | 13.05 | 13.55 |
| Trans. 72 | 14.05 | 14.05 | 14.55 |
| Trans. 65 | 14.60 | Grain Oriented | |
| Trans. 58 | 15.10 | Trans. 80 | 18.50 |
| Trans. 52 | 16.15 | Trans. 73 | 19.00 |

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*) Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*) (20¢ higher, HR); Zanesville, Butler (*A7*).

## LAKE SUPERIOR ORES

*51.50% Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.*

| | Gross Ton |
|---|---|
| Openhearth lump | $12.10 |
| Old range, bessemer | 11.25 |
| Old range, nonbessemer | 11.10 |
| Mesabi, bessemer | 11.00 |
| Mesabi, nonbessemer | 10.85 |
| High phosphorus | 10.85 |

## MERCHANT WIRE PRODUCTS

| F.o.b. Mill | Standard Q Coated Nails Col | Woven Wire Fence Col | "T" Fence Posts Col | Galv. Barbed and Twisted Barbless Wire Col | Merch. Wire Annld ¢/lb. | Merch. Wire Galv. ¢/lb. |
|---|---|---|---|---|---|---|
| Alabama City *R3* | 167 | 181 | 195 | 187 | 8.10 | 8.50 |
| Aliquippa, Pa. *J3*** | 164 | 179 | | 181 | 7.95 | 8.475 |
| Atlanta *A8*** | 166 | 182 | 192 | 190 | 8.05 | 8.65 |
| Bartonville *K2*** | 166 | 182 | 192 | 190 | 8.05 | 8.65 |
| Buffalo *W6* | | | | | 8.10 | 8.50 |
| Chicago, Ill. *N4*** | 164 | 180 | 167 190 | 188 | 7.95 | 8.55 |
| Cleveland *A6* | 173 | | | | 8.10 | |
| Cleveland *A5* | | | | | 7.95 | |
| Crawfordsville *M4*** | 166 | 182 | 192 | 190 | 8.05 | 8.65 |
| Donora, Pa. *A5* | 164 | 176 | 190 | 184 | 7.95 | 8.35 |
| Duluth *A5* | 164 | 176 | 190 | 184 | 7.95 | 8.35 |
| Fairfield, Ala. *T2* | 164 | 176 | 190 | 184 | 7.95 | 8.35 |
| Galveston *D4* | 169‡ | | | | | |
| Houston *S2* | 169 | 181 | 195 | 189 | 8.20 | 8.60 |
| Johnstown, Pa. *B3***** | 164 | 180 | 167 | 188 | 7.95 | 8.55 |
| Joliet, Ill. *A5* | 164 | 176 | 190 | 184 | 7.95 | 8.35 |
| Kokomo, Ind. *C9** | 166 | 178 | 192 | 186 | 8.05 | 8.45 |
| Los Angeles *B2*** | | | | | 8.90 | 9.50 |
| Kansas City *S2** | 169 | 181 | 195 | 189 | 8.20 | 8.60 |
| Minnequa *C6†* | 169 | 181 | 172 195 | 189 | 8.20 | 8.60 |
| Monessen *P6* | 167 | 185 | | 191 | 8.10 | 8.10 |
| Pittsburg, Cal. *C7* | 186 | 199 | | 204 | 8.90 | 9.30 |
| Portsmouth *P7* | | | | | 7.95 | |
| Rankin, Pa. *A5* | 164 | 176 | | 184 | 7.95 | 8.35 |
| So. Chicago *R3* | 167 | 181 | 195 | 187 | 8.10 | 8.50 |
| S. San Francisco *C6* | | | 214 | | 8.90 | 9.30 |
| Sparrows Pt. *B3*** | 166 | | 192 | 190 | 8.05 | 8.65 |
| Struthers, O. *Y1** | | | | | 7.95 | 8.45 |
| Worcester *A5* | 170 | | | | 8.25 | 8.65 |
| Williamsport, Pa. *S5* | | | 175 | | | |

* Zinc less than .10¢. † Plus zinc extras.
** 13.5 zinc. ‡ Wholesalers only
*** .10¢ zinc.

## C-R SPRING STEEL

| Cents Per Lb F.o.b. Mill | CARBON CONTENT 0.26–0.40 | 0.41–0.60 | 0.61–0.80 | 0.81–1.05 | 1.06–1.35 |
|---|---|---|---|---|---|
| Baltimore, Md. *T8* | 8.25 | 10.10 | 12.30 | 15.30 | 18.25 |
| Bristol, Conn. *W12* | | | 12.30 | 15.30 | 18.25 |
| Boston *T8* | 8.50 | 10.10 | 12.30 | 15.30 | 18.25 |
| Buffalo, N. Y. *R7* | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Carnegie, Pa. *S9* | ‡ | 9.80 | 12.00 | 15.00 | |
| Cleveland *A5* | 7.95 | 9.80 | 12.00 | 15.00 | 17.95 |
| Detroit *D1* | 8.05 | 9.90 | 12.10 | 15.10 | |
| Detroit *D2* | 8.05 | 9.90 | 12.10 | | |
| Dover, O. *G4* | 7.95 | 9.80 | 12.00 | 15.00 | 17.95 |
| Franklin Park, Ill. *T8* | 8.05 | 9.80 | 12.60 | 15.00 | 17.95 |
| Harrison, N. J. *C11* | | | 12.30 | 15.30 | 18.25 |
| Indianapolis *C5* | 8.10 | 9.95 | 12.60 | 15.00 | 17.95 |
| New Castle, Pa. *B4* | 7.95 | 9.80 | 12.60 | 15.00 | |
| New Haven, Conn. *D1* | 8.40 | 10.10 | 12.30 | 15.30 | |
| Pawtucket, R. I. *N7* | 8.50 | 10.10 | 12.30 | 15.30 | 18.25 |
| Pittsburgh *S7* | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Riverdale, Ill. *A1* | 8.05 | 9.80 | 12.00 | 15.00 | 17.95 |
| Sharon, Pa. *S1* | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Trenton *R4* | | 10.10 | 12.90 | 15.30 | 18.25 |
| Wallingford *W1* | 8.40 | 10.10 | 12.30 | 15.30 | 18.15 |
| Warren, Ohio *T4* | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Weirton, W. Va. *W3* | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |
| Worcester, Mass. *A5* | 8.50 | 10.10 | 12.30 | 15.30 | 18.25 |
| Youngstown *C3* | 7.95 | 9.80 | 12.60 | 15.00 | 17.95 |

‡ On Application.

## BOILER TUBES

| $ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill | Size OD-In. | Size B.W. Ga. | Seamless H.R. | Seamless C.D. | Elec. Weld H.R. | Elec. Weld C.D. |
|---|---|---|---|---|---|---|
| Babcock & Wilcox | 2 | 13 | 34.88 | 40.85 | 33.21 | |
| | 2½ | 12 | 46.98 | 55.01 | 44.73 | |
| | 3 | 12 | 54.24 | 63.53 | 51.66 | |
| | 3½ | 11 | 63.32 | 74.16 | 60.30 | |
| | 4 | 10 | 84.09 | 98.47 | 80.07 | |
| National Tube | 2 | 13 | 34.88 | 40.85 | 33.21 | |
| | 2½ | 12 | 46.98 | 55.01 | 33.73 | |
| | 3 | 12 | 54.24 | 63.53 | 51.66 | |
| | 3½ | 11 | 63.32 | 74.16 | 60.30 | |
| | 4 | 10 | 84.09 | 98.47 | 80.07 | |
| Pittsburgh Steel | 2 | 13 | 34.88 | 40.85 | | |
| | 2½ | 12 | 46.98 | 55.01 | | |
| | 3 | 12 | 54.24 | 63.53 | | |
| | 3½ | 11 | 63.32 | 74.16 | | |
| | 4 | 10 | 84.09 | 98.47 | | |

## WAREHOUSES

Metropolitan Price, dollars per 100 lb.

| Cities | City Delivery‡ Charge | Sheets: Hot-Rolled (18 ga. & hvr.) | Sheets: Cold-Rolled (15 gage) | Sheets: Galvanized (10 gage)†† | Strip: Hot-Rolled | Plates | Shapes: Standard Structural | Bars: Hot-Rolled (merchant) | Bars: Hot-Rolled (special quality) | Bars: Cold-Finished | Alloy Bars: Hot-Rolled 4615 As rolled | Alloy Bars: Hot-Rolled 4140 Annealed | Alloy Bars: Cold-Drawn 4615 As rolled | Alloy Bars: Cold-Drawn 4140 Annealed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Atlanta | | 8.17 | 9.37 | 9.83 | 8.21 | 8.55 | 8.59 | 8.30 | | 10.23 | | | | |
| Baltimore | $.10 | 7.79–7.98 | 8.99–9.08 | 9.12 | 8.27–8.46 | 8.12–8.36 | 8.57–8.85 | 8.34–8.48 | | 9.09–9.23 | 14.99 | 14.44 | 18.39 | 18.09 |
| Birmingham | .15 | 7.68–7.80 | 8.88–9.00 | 8.85 | 7.78–7.82 | 8.01 | 8.05–8.20 | 7.91 | 8.44 | 10.04–10.12 | | | | |
| Boston | .10 | 8.80–8.94 | 9.83–9.98 | 11.12 | 8.89–8.99 | 9.08–9.28 | 9.00–9.20 | 8.98 | 9.53 | 10.71–10.81 | 15.05 | 14.59 | 18.51 | 18.24 |
| Buffalo | .15 | 8.00 | 9.15 | 10.90–11.86 | 8.20 | 8.65 | 8.65 | 8.15 | 8.85 | 8.85 | 15.00 | 14.45 | 18.40 | 18.10 |
| Chicago | .15 | 7.80 | 9.00 | 9.85 | 7.82–7.97 | 8.31 | 8.20–8.35 | 7.91–8.06 | 8.44–8.59 | 8.35 | 14.65 | 14.10 | 18.05 | 17.75 |
| Cincinnati | .15 | 8.09 | 9.20 | 9.90 | 8.29 | 8.67 | 8.89 | 8.34 | 8.87 | 8.97 | 14.93 | 14.38 | 18.33 | 18.03 |
| Cleveland | .15 | 7.93 | 9.13 | 9.75 | 8.07 | 8.54 | 8.72 | 8.14 | 8.67 | 8.75 | 14.73 | 14.18 | 18.13 | 17.83 |
| Denver | | 9.55 | 11.09 | 12.41 | 9.70 | 9.80 | 9.60 | 9.75 | | 10.54 | | | | 19.79 |
| Detroit | .15 | 8.18 | 9.40 | 10.20–11.70 | 8.32 | 8.66 | 8.89 | 8.33 | 8.86 | 8.83 | | 14.36 | | 18.01 |
| Houston | | 8.70 | 9.65 | | 8.80 | 8.60 | 8.90 | 8.95 | | 10.55 | 15.50 | | 19.30 | 19.05 |
| Kansas City | .20 | 8.52 | 9.72 | 10.07 | 8.60 | 8.83 | 8.87 | 8.73 | | 9.42 | 15.32 | 14.77 | 18.72 | 18.42 |
| Los Angeles | .10 | 9.00–9.20 | 10.75–10.90 | 11.75 | 9.20–9.25 | 9.45 | 9.05 | 8.90 | 9.60 | 11.80 | 15.85 | 15.35 | 19.70 | 19.45 |
| Memphis | .15 | 8.02 | 9.22 | | 8.12 | 8.35 | 8.39 | 8.25 | | 9.85 | | | | |
| Milwaukee | .15 | 8.08 | 9.28 | 9.97 | 8.10 | 8.44 | 8.56 | 8.18 | 8.71 | 8.72 | 14.77 | 14.22 | 18.17 | 17.87 |
| New York | .10 | 8.55 | 9.76 | 10.33 | 9.00 | 9.11 | 9.01 | 8.93 | 9.48 | 10.71 | 15.02 | 14.49 | 18.42 | 18.14 |
| Norfolk | .20 | 8.00 | | | 8.40 | 8.35 | 8.70 | 8.45 | | 10.70 | | | | |
| Philadelphia | .10 | 8.25 | 9.17 | 9.66–10.22 | 8.68–8.92 | 8.38–8.78 | 8.48–8.80 | 8.47–8.65 | 9.18 | 9.41 | 14.80 | 14.25–14.41 | 18.20 | 18.06 |
| Pittsburgh | .15 | 7.93 | 9.14 | 10.20 | 7.88–8.07 | 8.31 | 8.35 | 8.06** | 8.59 | 8.75 | 14.65 | 14.10 | 18.05 | 17.75 |
| Portland | | 8.90 | 9.65 | 11.40 | 9.05 | 8.70 | 8.90 | 8.95 | | 13.55 | 16.70 | 16.10 | 20.40 | 20.25 |
| San Francisco | .10 | 8.85 | 10.40 | 10.90 | 9.05 | 8.95 | 8.95 | 8.90 | 9.45 | 12.40 | 15.85 | 15.35 | 19.70 | 19.45 |
| Seattle | | 9.35–9.55 | 10.45–10.70 | 11.55–11.65 | 9.50 | 9.05–9.30 | 9.15–9.35 | 9.30 | 9.85 | 13.15–13.30 | 16.10 | 15.55 | 19.50 | 19.20 |
| Spokane | .15 | 9.50–9.70 | 10.60–10.85 | 11.80 | 9.70 | 9.20–9.45 | 9.30–9.50 | 9.45 | 10.00 | 13.30 | | 16.45 | | 20.10 |
| St. Louis | .15 | 8.29–8.54 | 9.49–9.74† | 10.03–10.21 | 8.11–8.34 | 8.34–8.67 | 8.82 | 8.40–8.43 | 8.96 | 9.08–9.11 | 14.83–14.98 | 14.43 | 18.23–18.38 | 18.08 |
| St. Paul | .15 | 8.29 | 9.64 | 10.31 | 8.39–8.58 | 8.71–9.05 | 8.75–9.09 | 8.52 | | 9.21 | | 14.62 | | 18.27 |

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
**F.O.B. Plant, warehouse price. †16 gage. ††13½¢ zinc. ‡Deduct for country del'ry.

*(Effective Jan. 29, 1957)*

## RAILS, TRACK SUPPLIES

| F.o.b. Mill Cents Per Lb | No. 1 Std. Rails | Light Rails | Joint Bars | Track Spikes | Screw Spikes | Tie Plates | Track Bolts Untreated |
|---|---|---|---|---|---|---|---|
| Bessemer *U1* | 5.075 | 6.00 | 6.35 | | | | |
| So. Chicago *R3* | | | | 8.775 | | | |
| Ensley *T2* | 5.075 | 6.00 | | | | | |
| Fairfield *T2* | | 6.00 | | 8.775 | | 6.025 | |
| Gary *U1* | 5.075 | 6.00 | | | | 6.025 | |
| Ind. Harbor *I3* | 5.075 | | 6.35 | 8.775 | | 6.025 | |
| Ind. Harbor *Y1* | | | | 8.775 | | | |
| Johnstown *B3* | | 6.00 | | | | | |
| Joliet *U1* | 5.075 | | 6.35 | | | | |
| Kansas City *S2* | | | | 8.775 | | | |
| Lackawanna *B3* | 5.075 | 6.00 | 6.35 | | | 6.025 | |
| Lebanon *B3* | | | | | | | 13.10 |
| Minnequa *C6* | 5.075 | 6.50 | 6.35 | 8.775 | | 6.025 | 13.10 |
| Pittsburgh *P5* | | | | 8.775 | 12.85 | | |
| Pittsburgh *J3* | | | | 8.775 | | | 13.10 |
| Seattle *B2* | | | | 9.275 | | 6.175 | 13.16 |
| Steelton *B3* | 5.075 | | 6.35 | | | 6.025 | 13.10 |
| Struthers *Y1* | | | | 8.775 | | | |
| Torrence *C7* | | | | | | | |
| Williamsport *S5* | | 6.15 | | | | | |
| Youngstown *R3* | | | | 8.775 | | | |

## COKE

Furnace, beehive (f.o.b. oven) Net-Ton
Connellsville, Pa. ..... $15.00 to $15.75
Foundry, beehive (f.o.b. oven)
$17.50 to $19.00
Foundry oven coke
Buffalo, del'd ..... $30.75
Detroit, f.o.b. ..... 29.50
New England, del'd ..... 30.55
Kearny, N. J., f.o.b. ..... 29.75
Philadelphia, f.o.b. ..... 29.50
Swedesland, Pa., f.o.b. ..... 29.50
Painesville, Ohio, f.o.b. ..... 29.50
Erie, Pa., f.o.b. ..... 29.50
Cleveland, del'd ..... 31.55
Cincinnati, del'd ..... 28.59
St. Paul, f.o.b. ..... 29.75
St. Louis, f.o.b. ..... 30.50
Birmingham, f.o.b. ..... 27.60
Milwaukee, f.o.b. ..... 29.50
Lone Star, f.o.b. ..... 25.50
Neville, Is., Pa. ..... 29.25

## ELECTRODES

*Cents per lb f.o.b. plant, threaded, with nipples, unboxed.*

| GRAPHITE | | | CARBON* | | |
|---|---|---|---|---|---|
| Diam. (In.) | Length (In.) | Price | Diam. (In.) | Length (In.) | Price |
| 24 | 84 | 24.75 | 40 | 100, 110 | 10.70 |
| 20 | 72 | 24.00 | 35 | 110 | 10.70 |
| 16 to 18 | 72 | 24.50 | 30 | 110 | 10.85 |
| 14 | 72 | 25.00 | 24 | 72 to 84 | 11.25 |
| 12 | 72 | 25.50 | 20 | 90 | 11.00 |
| 10 | 60 | 26.50 | 17 | 72 | 11.40 |
| 10 | 48 | 27.00 | 14 | 72 | 11.85 |
| 7 | 60 | 26.75 | 12 | 60 | 12.95 |
| 6 | 60 | 30.00 | 10 | 60 | 13.00 |
| 4 | 40 | 33.25 | 8 | 60 | 13.30 |
| 3 | 40 | 35.25 | | | |
| 2½ | 30 | 37.25 | | | |
| 2 | 24 | 57.75 | | | |

*Prices shown cover carbon nipples.

## ELECTROPLATING SUPPLIES

### Anodes

*(Cents per lb, frt allowed in quantity)*

Copper
Cast elliptical, 18 in. or longer, 5000 lb lots ..... 53.42
Electrodeposited ..... 43.28
Brass, 80-20, ball anodes, 2000 lb or more ..... 54.00
Zinc, ball anodes, 2000 lb lots ... 21.25
(for elliptical add 2¢ per lb)
Nickel, 99 pct plus, rolled carbon $1.0225
(rolled depolarized add 3¢ per lb)
Cadmium ..... $1.70
Tin, ball anodes and elliptical $1.07 per in.

### Chemicals

*(Cents per lb, f.o.b. shipping point)*

Copper cyanide, 100 lb drum ... 77.50
Copper sulphate, 5 or more 100 lb bags, per cwt ..... 26.65
Nickel salts, single, 100 lb bags ..40.50
Nickel chloride, freight allowed, 300 lb ..... 45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums ..... 23.05
(Philadelphia price 23.30)
Zinc cyanide, 100 to 900 lb ..... 55.55
Potassium cyanide, 100 lb drum N. Y. ..... 48.00
Chromic acid, flake type, 1 to 20 100-499 lb drums ..... $1.75

## BOLTS, NUTS, RIVETS, SCREWS

*(Base discount, f.o.b. mill)*

| Machine and Carriage Bolts | Full Container Price | Pct Discounts 30 Containers | 20,000 Lb. | 40,000 Lb. |
|---|---|---|---|---|
| ½" and smaller x 6" and shorter | 55 | 58½ | 60½ | 61½ |
| ⅝" thru 1" x longer than 6" | 48½ | 50 | 52½ | 54 |
| Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter | 55 | 58½ | 60½ | 61½ |
| Lag, all diam. x 6" & shorter | 55 | 58 | 60 | 61 |
| Lag, all diam. longer than 6 in. | 47 | 50 | 52 | 53 |
| Plow bolts, ½" and smaller x 6" and shorter | 54 | 57½ | 59 | 60 |

*(Add 25 pct for broken case quantities)*

### Nuts, Hex, HP reg. & hvy.

| | Full Case or Keg Price |
|---|---|
| ¾ in. or smaller | 63 |
| ⅞ in. to 1 in. inclusive | 59½ |
| 1⅛ in. to 1½ in. inclusive | 64 |
| 1⅝ in. and larger | 58 |

### C.P. Hex regular & hvy.

| | |
|---|---|
| ¾ in. and smaller | 63 |
| ⅞ in. to 1½ in. inclusive | 59½ |
| 1⅝ in. and larger | 58 |

### Hot Galv. Nuts (All Types)

| | |
|---|---|
| ¾" and smaller | 50 |

### Semi-finished Hex Nuts

| | |
|---|---|
| ¾ in. and smaller | 63 |
| ⅞ in. to 1½ in. inclusive | 59½ |
| 1⅝ in. and larger | 58 |

*(Add 25 pct for broken case or keg quantities)*

### Finished

| | |
|---|---|
| 1" and smaller | 65 |

### Rivets

| | Base per 100 lb |
|---|---|
| ½ in. and larger | $10.85 |
| | Pct Off List |
| 7/16 in. and smaller | 26½ |

### Cap Screws

| | Discount (Packages) Bright Treated | H. C. Heat |
|---|---|---|
| New std. hex head, packaged | | |
| ⅝" diam. and smaller x 6" and shorter | 47 | 34 |
| ¾", ⅞" and 1" diam. x 6" and shorter | 31 | 13 |
| ⅝" diam. and smaller x longer than 6" | 18½ | + 1 |
| ¾", ⅞" and 1" diam. & longer than 6" | 5½ | +19½ |

| | C-1018 Steel Full-Finished Cartons | Bulk |
|---|---|---|
| ¼" through ⅝" dia. x 6" and shorter | 47 | 63 |
| ¾" through 1" dia. x 6" and shorter | 31 | 51½ |

Minimum quantity—¼" through ⅜" diam., 15,000 pieces; 1/16" through ⅝" diam., 5,000 pieces; ¾" through 1" diam., 2,000 pieces.

### Machine Screws & Stove Bolts

| Plain Finish | Quantity | Discount Mach. Screws | Stove Bolts |
|---|---|---|---|
| Cartons | | 19 | 32 |
| Bulk | | | |
| To ¼" diam. incl. | 25,000-200,000 | 9 | 54 |
| 5/16 to ½" diam. incl. | 15,000-100,000 | 9 | 54 |
| All diam. over 3" long | 5,000-100,000 | — | 54 |

### Machine Screw & Stove Bolt Nuts

| | Quantity | Discount Hex | Square |
|---|---|---|---|
| In cartons | | 16 | 19 |
| In Bulk | | | |
| ⅜" diam. & smaller | 15,000-100,000 | 7 | 9 |

## CAST IRON WATER PIPE INDEX

| | |
|---|---|
| Birmingham | 119.0 |
| New York | 131.4 |
| Chicago | 133.4 |
| San Francisco-L. A. | 140.2 |

*Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955 issue. Source: U. S. Pipe and Foundry Co.*

## REFRACTORIES

### Fire Clay Brick

*Carloads per* 1000

| | |
|---|---|
| First quality, Ill., Ky., Md., Mo., Ohio, Pa. (exc pt Salina, Pa., add $5.00) | $128.00 |
| No. 1 Ohio | 128.00 |
| Sec. quality, Pa., Md., Ky., Mo., Ill. | 114.00 |
| No. 2 Ohio | 98.00 |
| Ground fire clay, net ton, bulk (except Salina, Pa., add $2.00) | 20.00 |

### Silica Brick

| | |
|---|---|
| Mt. Union, Pa., Ensley, Ala. | $140.00 |
| Childs, Hays, Pa. | 145.00 |
| Chicago District | 150.00 |
| Western Utah | 144.00-165.00 |
| California | 170.00 |
| Super Duty Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville | 150.00-157.00 |
| Silica cement, net ton, bulk, Latrobe | 26.50 |
| Silica cement, net ton, bulk, Chicago | 24.00 |
| Silica cement, net ton, bulk, Ensley, Ala. | 25.50 |
| Silica cement, net ton, bulk, Mt. Union | 23.00 |
| Silica cement, net ton, bulk, Utah and Calif. | 35.00 |

### Chrome Brick

*Per net ton*

| | |
|---|---|
| Standard chemically bonded, Balt. | $98.00 |
| Standards chemically bonded, Curtiner, Calif. | 108.00 |
| Burned, Balt. | 92.00 |

### Magnesite Brick

| | |
|---|---|
| Standard, Baltimore | $121.00 |
| Chemically bonded, Baltimore | 109.00 |

### Grain Magnesite

St. ⅜ to ½-in. grains

| | |
|---|---|
| Domestic, f.o.b. Baltimore in bulk. | $69.40 |
| Domestic, f.o.b. Chewalah, Wash., Luning, Nev. | |
| in bulk | 43.00 |
| in sacks | 49.00 |

### Dead Burned Dolomite

*Per net ton*

| | |
|---|---|
| F.o.b. bulk, producing points in: | |
| Pa., W. Va., Ohio | $16.00 |
| Midwest | 16.35 |
| Missouri Valley | 15.00 |

## METAL POWDERS

*Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh*

| | |
|---|---|
| Swedish sponge iron f.o.b. Riverton, N. J., ocean bags | 8.50¢ |
| Canadian sponge iron, Del'd in East, carloads | 9.5¢ |
| Domestic sponge iron, 98+% Fe, carload lots | 8.5¢ |
| Electrolytic iron, annealed, imported 99.5+% Fe | 27.5¢ |
| domestic 99.5+% Fe | 36.5¢ |
| Electrolytic iron, unannealed minus 325 mesh, 99+% Fe | 57.0¢ |
| Electrolytic iron melting stock, 99.84% pure | 22.0¢ |
| Carbonyl iron size 5 to 10 micron, 98%, 99.8+% Fe. | 86.0¢ to $1.55 |
| Aluminum, freight allowed | 38.00¢ |
| Brass, 10 ton lots | 37.50¢ to 50.00¢ |
| Copper, electrolytic | 49.75¢ |
| Copper, reduced | 49.75¢ |
| Cadmium, 100-199 lb, 95¢ plus metal value | |
| Chromium, electrolytic 99.85% min. Fe .03 max. Del'd | $5.00 |
| Lead | 8.90¢ plus metal value |
| Manganese | 70.0¢ |
| Molybdenum, 99% | $3.60 to $3.95 |
| Nickel, unannealed | $1.00 |
| Nickel, annealed | $1.06 |
| Nickel, spherical, unannealed #80 | $1.13 |
| Silicon | 43.50¢ |
| Solder powder | 7.0¢ to 9.0¢ plus met. value |
| Stainless steel, 302 | 99.0¢ |
| Stainless steel, 316 | $1.32 |
| Tin | 14.00¢ plus metal value |
| Tungsten, 99% (65 mesh) | $4.20 |
| Zinc, 10 ton lots | 18.75¢ to 32.50¢ |

# Ferroalloy Prices

*(Effective Jan. 29, 1957)*

### Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

| | | |
|---|---|---|
| 0.02% C ... 41.50 | 0.20% C ... | 38.50 |
| 0.03% C ... 41.00 | 0.50% C ... | 38.25 |
| 0.06% C ... 39.50 | 1.00% C ... | 37.50 |
| 0.10% C ... 39.00 | 1.50% C ... | 37.35 |
| 0.15% C ... 38.75 | 2.00% C ... | 37.25 |

4.00-4.50% C, 67.70% Cr, 1-2% Si.. 27.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ..... 27.75
0.025% C (Simplex) ..... 34.75
0.10% C, 50-52% Cr, 2% max Si .. 35.75
8.50% max. C, 50-55% Cr, 3-6% Si .. 24.00
8.50% C, 50-55% Cr, 3% max Si.... 24.00

### High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

### Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

| | |
|---|---|
| 0.10% max. C ..... | $1.31 |
| 0.50% max. C ..... | 1.31 |
| 9 to 11% C, 33-91% Cr, 0.75% Fe.. | 1.40 |

### Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

| | |
|---|---|
| Carloads ..... | $1.29 |
| Ton lots ..... | 1.31 |
| Less ton lots ..... | 1.33 |

### Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 8-in. x down, per lb of Cr, packed.

| | |
|---|---|
| Carloads ..... | 44.65 |
| Ton lots ..... | 48.95 |
| Less ton lots ..... | 51.45 |

### Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Ca, 60-65% Si, 3.00 max. Fe.

| | |
|---|---|
| Carloads ..... | 25.65 |
| Ton lots ..... | 27.95 |
| Less ton lots ..... | 29.45 |

### Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

| | |
|---|---|
| Carloads ..... | 24.25 |
| Ton lots ..... | 26.15 |
| Less ton lots ..... | 27.15 |

### SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ⅛ in. x 12 mesh.

| | |
|---|---|
| Ton lots ..... | 20.15 |
| Less ton lots ..... | 21.40 |

### V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

| | |
|---|---|
| Carload lots ..... | 17.30 |
| Ton lots ..... | 18.70 |
| Less ton lots ..... | 19.95 |

### Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

| | |
|---|---|
| Carload packed ..... | 18.50 |
| Ton lots to carload packed..... | 19.65 |
| Less ton lots ..... | 20.90 |

### Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

| Producing Point | Cents per-lb |
|---|---|
| Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore ..... | 12.75 |
| Johnstown, Pa. ..... | 12.75 |
| Sheridan, Pa. ..... | 12.75 |
| Philo, Ohio ..... | 12.75 |
| S. Duquesne ..... | 12.75 |

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

| | |
|---|---|
| Carloads, bulk ..... | 14.80 |
| Ton lots packed ..... | 17.20 |

### Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

| Manganese | Silicon | |
|---|---|---|
| 16 to 19% | 3% max. ..... | $100.50 |
| 19 to 21% | 3% max. ..... | 102.50 |
| 21 to 23% | 3% max. ..... | 105.00 |

### Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

| | |
|---|---|
| Carload, packed ..... | 45.75 |
| Ton lots ..... | 47.25 |

### Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

| | |
|---|---|
| Carloads ..... | 33.00 |
| Ton lots ..... | 35.00 |
| 250 to 1999 lb ..... | 37.00 |
| Premium for hydrogen-removed metal ..... | 0.75 |

### Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn... 25.50

### Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

| | Carloads | Ton | Less |
|---|---|---|---|
| 0.07% max. C, 0.06% P, 90% Mn ..... | 37.15 | 39.95 | 41.15 |
| 0.07% max. C ..... | 35.10 | 37.90 | 39.10 |
| 0.10% max. C ..... | 34.35 | 37.15 | 38.35 |
| 0.15% max. C ..... | 33.60 | 36.40 | 37.60 |
| 0.30% max. C ..... | 32.10 | 34.90 | 36.10 |
| 0.50% max. C ..... | 31.60 | 34.40 | 35.60 |
| 0.75% max. C, 80-85% Mn, 5.0-7.0% Si.... | 28.60 | 31.40 | 32.60 |

### Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

| | |
|---|---|
| Carloads bulk ..... | 13.80 |
| Ton lots ..... | 15.45 |
| Briquet contract basis carloads, bulk, delivered, per lb of briquet ..... | 15.10 |
| Ton lots, packed ..... | 17.50 |

### Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

### Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

| | Ton lots | Carloads |
|---|---|---|
| 96.50% Si, 2% Fe ... | 23.95 | 22.65 |
| 98% Si, 0.75% Fe .... | 24.45 | 23.15 |

### Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

| | |
|---|---|
| Carloads, bulk ..... | 7.70 |
| Ton lots, packed ..... | 10.50 |

### Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

| | | | |
|---|---|---|---|
| 50% Si ... | 13.90 | 75% Si ... | 16.80 |
| 65% Si ... | 15.65 | 85% Si ... | 18.50 |
| | 90% Si ... | 19.90 | |

### Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

| | Cast | Turnings | Distilled |
|---|---|---|---|
| Ton lots ..... | $2.05 | $2.95 | $3.75 |
| Less ton lots.. | 2.40 | 3.30 | 4.55 |

### Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

| | |
|---|---|
| Openhearth ..... | 3.20 |
| Crucible ..... | 3.30 |
| High speed steel (Primos) ..... | 3.40 |

**Alsifer,** 20% Al, 40% Si, 40% Fe. Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

| | |
|---|---|
| Carloads ..... | 10.65¢ |
| Ton lots ..... | 11.80¢ |

**Calcium molybdate,** 43.6-46.6% f.o.b. Langeloth, Pa., per pound Contained Mo. ..... $1.28

**Ferrocolumbium,** 50-50%, 2 in. x D contract basis, delivered per pound contained Cb.

| | |
|---|---|
| Ton lots ..... | $6.90 |
| Less ton lots ..... | 6.95 |

**Ferro-tantalum-columbium,** 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta.... $4.95

**Ferromolybdenum,** 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.68

**Ferrophosphorus,** electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ..... $90.00
10 tons to less carload ..... $110.00

**Ferrotitanium,** 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

**Ferrotitanium,** 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.50
Less ton lots ..... $1.55

**Ferrotitanium,** 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ..... $215.00

**Ferrotungsten,** ¼ x down, packed, per pounds contained W, ton lots delivered ..... $3.15

**Molybdic oxide,** briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ..... $1.41
bags, f.o.b. Washington, Pa., Langeloth, Pa. ..... $1.38

**Simanal,** 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

| | |
|---|---|
| Carload, bulk lump ..... | 18.50¢ |
| Ton lots, packed lump..... | 20.50¢ |
| Less ton lots ..... | 21.00¢ |

**Vanadium oxide,** 86-89% $V_2O_5$ contract basis, per pound contained $V_2O_5$ ..... $1.33

**Zirconium** contract basis, per lb of alloy

| | |
|---|---|
| 35-40% f.o.b. freight allowed, carloads, packed ..... | 27.25¢ |
| 12-15%, del'd lump, bulk-carloads ..... | 9.25¢ |

### Boron Agents

**Borosil,** contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

| | |
|---|---|
| 2000 lb carload ..... | $5.50 |

**Bortam,** f.o.b. Niagara Falls,

| | |
|---|---|
| Ton lots, per pound..... | 45¢ |
| Less ton lots, per pound.... | 50¢ |

**Corbortam,** Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.

| | |
|---|---|
| Ton lots per pound..... | 14.00¢ |

**Ferroboron,** 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.... 1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

| | |
|---|---|
| 10 to 14% B ..... | .85 |
| 14 to 19% ..... | 1.20 |
| 19% min. B. ..... | 1.50 |

**Grainal,** f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

| | |
|---|---|
| No. 1 ..... | $1.05 |
| No. 79 ..... | 50¢ |

**Manganese - Boron,** 75.00% Mn, 15.20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

| | |
|---|---|
| Ton lots ..... | $1.46 |
| Less ton lots ..... | 1.57 |

**Nickel-Boron,** 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ..... $2.15

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# THE CLEARING HOUSE

## News of Used and Rebuilt Machinery

**Chasing Supplies . . .** Business is good up and down the West Coast. Used machinery dealers say 1957 will be another big year. Here's the latest rundown on that area:

Los Angeles dealers are really busy with demand strong for almost every type of used machinery. Big job is finding enough of it, fast enough, to go around. Dealers expect the supply problem will be a headache for most of the year.

**Better, Thank You . . .** However, the short supply is somewhat eased in southern California. There's equipment kicking loose from USAF depots and hundreds of firms in the throes of expansion and modernization. On the whole, dealers are now less inclined to buy machines in the East than some months ago. Foreign machine sales are coming into the picture a little stronger.

**Still Hard to Find . . .** Most wanted and hardest to get: late model milling machines, engine lathes, planers, and big mills.

Sheet metal equipment continues a hot sales pace. Only eastern buying now done by dealers is for large size presses and shears. Buyers seem willing to take older machines.

Heavy spot welders, long a drag on the market, haven't picked up. However, there's brisk business in the smaller sizes. Electronics equipment manufacturers are eating them up.

**Seller's Market . . .** In the San Francisco Bay Area, dealers agree, "This is going to be the purchasing year for machinery."

They base their optimism on the fact that last year was one full of announcements of new plants and expansions. Now those facilities will have to be filled with equipment.

Of course, the new machinery dealers will get the giant portion of the business. But there will be a good market for used machines in some particular phases of an operation—where the equipment doesn't get enough use to warrant the expense of new stuff.

**"Captives" a Factor . . .** In addition, opening of numerous "captive shops" is expected. These smaller organizations will do contract work for the big fellows. They probably will rely heavily on used machinery since their limited capitalization will make this necessary.

What's selling best in the San Francisco Bay Area? Milling machines, lathes, boring mills, and radial drills. Machinery over 10 years old moves slowly. Newer stuff, up to five or seven years old, reconditioned with new parts, will bring as much as 80 pct of new equipment, dealers report.

**Tools from The East . . .** A limited amount of buying from the East continues. Chicago and Indianapolis Government Surplus Depots supply considerable merchandise for western needs.

High-quality used machinery in Seattle would command a top price. But it's simply not available.

There's no particularly sought heavy item at Seattle—they're all short. Any of the top brands in the various product classifications would be acceptable.

"OK, watch the micrometer!"

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**BENDER—PIPE**
6" U. S. Pipe Bender, Titan Model
**BENDING ROLLS**
6' x 3/16" Niagara Initial Type
10' x ½" Bertsch Initial Type
10' x ½" King Pyramid Type
16' x ⅝" Niles Pyramid Type
20' x ⅝" Niles Pyramid Type
**BRAKES—LEAF TYPE**
8' x 3/16" Dreis & Krump
12' x ¼" Dreis & Krump
**BRAKES—PRESS TYPE**
8' x ¼" Geo. A. Ohl
10' x ½" Superior Hydraulic—NEW
12" x ½" Superior Hydraulic—NEW
**CRANES—OVERHEAD ELECTRIC TRAVELING**
5 ton R&M 40' Span 220/3/60 A.C.
Floor Control—New 1955
5 ton Whiting 48' Span 230/3/60 A.C.
5 ton Shaw 56' Span 230 Volt D.C.
10 ton P&H 38' Span 230 Volt D.C.
10 ton R&M 40' Span 220/3/60 A.C.
15 ton P&H 48' Span 230 Volt D.C.
15 ton P&H 72' Span 230 Volt D.C.
120 ton Niles 68' Span 440/3/60 A.C.
**DRAW BENCH**
10,000# Aetna Standard, Length of Draw 44'. Used to draw SAE 1035 Welded Steel Tubing
**FORGING MACHINES**
1" to 5" Acme, Ajax, National
4" Acme Model XN, Air Clutch, NEW 1954
**HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—600 lb. to 20,000 lb.**
**LEVELER—STRETCHER**
100 ton Hydr. Stretcher Leveler, Capy. .032" Ga. 36" Width, 96" Length; 4 Sheets in a Pack

**LEVELLERS—ROLLER**
48" Aetna Standard, 17 Rolls 3¾" Dia.
54" McKay, 17 Rolls 3¾" Dia.
**PRESSES—HYDRAULIC**
750 ton Baldwin Triple Acting Bolster 84 x 132"
1200 ton United Steam Hydraulic Forging Press
4500 Baldwin-Lima-Hamilton Hydr. Forging Press.
**PRESSES—HYDRAULIC WHEEL**
600 ton N-B-P, 96" Between Strain Bars
800 ton N-B-P, 96" Between Strain Bars
**PRESSES—STRAIGHT SIDE**
Verson SI-40 200 ton, 30" Stroke, Bed 40"x44"
Bliss #8C 300 ton, 16" Stroke, Bed 44"x83"
Toledo 203E Overhanging 10" Str. 38x40" Bolster
**PUNCH & SHEAR COMBINATIONS**
Cleveland Style EF Single End, 42" Throat
Cleveland Style G Single End, 60" Throat
Cleveland Style W, 60" Throat
No. 1½ Buffalo Universal Ironworker
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M½-H Yoder 10 Stand, Roll Shaft Dia. 1½"
Model 14 L-M-1 Tishken Roll Forming Machine 1½" Dia. Spindle, 3½" Capacity, With Cut-Off
**ROLLS—PLATE STRAIGHTENING**
72" Bertsch Seven Rolls, 7" Dia.
72" Hilles & Jones, Six Rolls 11" Dia.
**ROLLING MILLS**
9" Bar Mill
18" Three High Bar Mill
10" x 14" Single Stand Two High
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12" x 16" Single Stand Two High
16" x 24" Farrel Two Stand, Two High
16" x 3" Single Stand, Two High
20" x 38" Single Stand Two High

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22" x 40" Three High Sheet Mill
**SHEAR—ALLIGATOR**
No. 4 Mesta RH LK, Capacity 2" x 12"
**SHEARS—SQUARING**
6' x 10" Ga. Niagara No. 672
8' x ¼" Niagara—NEW 1952
10' x ⅜" Niagara—NEW 1950
12' x ½" Cincinnati
16' x 3/16" Long & Alstatter
**SHEAR—MISC.**
Lowey Flying Shear with ratchet driven measuring rolls, Capacity .125" x 36" wide
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12" Blake & Johnson
24" Blake & Johnson
36" Weant Slitting Line
32" Stamco Slitting Line
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Kane & Roach Type B, Capy. ⅞" Hex., Flat 4"x1/32" Flat & Edge 1⅞"x3/16"
**SWAGING MACHINE**
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60,000, 100,000, 200,000 Olsen & Riehle Universal
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*3 phase—60 cycle*

SLIP RING

| Qu. | H.P. | Make | Type | Volts | Speed |
|---|---|---|---|---|---|
| 2 | 1750 | G.E. | M-579BS | 4800 | 1800 |
| | 1500 | G.E. | MT | 6600 | 257 |
| 1 | 1100 | F.M. | OVZK, B.B. | 4800 | 1800 |
| 1 | 1000 | A.C. | Mill | 2300 | 240 |
| 1 | 800 | G.E. | MT | 2300 | 293 |
| 1 | 750 | G.E. | MT-573 | 2200 | 1190 |
| 1 | 700 | A.C. | | 2300 | 500 |
| 1 | 500 | Whse. | CW | 550 | 350 |
| 1 | 400 | Whse. | CW | 440 | 514 |
| 1 | 350 | G.E. | IM-17A | 440/2200 | 720 |
| 1 | 250 | G.E. | MT-424Y | 4000 | 257 |
| 1 | 250 | Cr. Wh. | Size 290 | 2300 | 350 |
| 1 | 250 | Al. Ch. | | 550 | 600 |
| 1 | 200 | G.E. | IE13 B-M | 220/440 | 1760 |
| 1 | 200 | G.E. | MT-557Y | 220/440 | 1760 |
| 1 | 200 | Cr. Wh. | 20QB | 440 | 505 |
| 1 | 200 | G.E. | IM | 440 | 435 |
| 1 | 200 | G.E. | IM | 2200 | 580 |
| 1 | 150 (unused) | Whse. | CW | 2300 | 435 |
| 2 | 125 | A.C. | | 440 | 865 |
| 1 | 125 | Al. Ch. | | 440 | 720 |
| 1 | 100 | G.E. | IM-16 | 2200 | 435 |
| 1 | 100 | G.E. | IM | 440 | 600 |
| 4 | 100 | A.C. | ANY | 440 | 695 |

SQUIRREL CAGE

| | | | | | |
|---|---|---|---|---|---|
| 1 | 800 | G.E. | KT-573 | 2200 | 1180 |
| 1 | 650 | G.E. | FT-559BY | 440 | 3570 |
| 2 | 450 | Whse. | CS-1420 | 2300/4150 | 354 |
| 1 | 400 | G.E. | IK | 2200 | 500 |
| 1 | 300 | G.E. | KT-559A | 2300 | 1775 |
| 1 | 200 | G.E. | IK-17 | 440 | 580 |
| 3 | 200 | G.E. | KT-557 | 440 | 1800 |
| 1 | 150/75 | G.E. | IK | 440/900/450 | |
| 1 | 150 | Whse. | CS8568 | 440 | 880 |
| 1 | 150 | Whse. | CS | 440 | 580 |

SYNCHRONOUS

| Qu. | H.P. | Make | Types | Volts | RPM |
|---|---|---|---|---|---|
| 1 | 7000 | G.E. | ATI | 2200/6600 | 600 |
| 1 | 4350 | C.W. | 3501SL4000/6900/13800 | | 514 |
| 1 | 2850 | Whse. | 8p.f. | 2300/4600 | 514 |
| 1 | 2800 | Whse. | 8p.f. | 2300 | 720 |
| 2 | 2000 | Whse. | | 2300 | 120 |
| 2 | 1750 | G.E. | ATI | 2300 | 3600 |
| 1 | 735 | G.E. | ATI | 2200/12000 | 600 |
| 1 | 450 | Whse. | | 2200 | 128.5 |
| 1 | 325 | G.E. | ATI | 440 | 1800 |
| 1 | 225 | G.E. | ATI | 440 | 1800 |
| 1 | 100 | G.E. | TS-7556 | 220/440 | 900 |

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| Qu. | K.W. | R.P.M. | Make | Volts D.C. | Volts A.C. |
|---|---|---|---|---|---|
| 1 | 1250 | 720 | G.E. | 600 | 2300/4160 |
| 1 | 1000 | 720 | Whse. | 600 | 2300/4160 |
| 1 | 500 | 1200 | Whse. | 125/250 | 2300/440 |
| 1 | 500 | 720 | Cr. Wh. | 575/600 | 2300 |
| 1 | 300 | 1200 | Al. Ch. 3-unit | 250 | 2300 |
| 1 | 300 | 1200 | G.E. | 250 | 2300 |
| 1 | 200 | 1200 | Cr. Wh. | 250 | 2300 |
| 1 | 200 | 1200 | Elliott | 125 | 4000/2300 |
| 1 | 200 | 900 | G.E. | 250 | 2300 |
| 1 | 175 | 1200 | G.E. | 250 | 440/220 |
| 2 | 150 | 1200 | Whse. SK | 250 | 2300/440 |
| 2 | 150 | 1200 | Reliance | 125 | 2300/440 |
| 1 | 150 | 1200 | G.E. | 250 | 2300 |
| 1 | 100 | 1200 | Whse. SK | 125/250 | 440/220 |
| 1 | 100 | 1200 | Al. Ch. | 250 | 4600/2300 |

DIRECT CURRENT MOTORS

| Qu. | H.P. | Make | Type | Volts | R.P.M. |
|---|---|---|---|---|---|
| 1 | 1500 | Whse. | Encl | 525 | 600 |
| 1 | 1000 | G.E. | Mill | 600 | 150/300 |
| 1 | 1050 | G.E. | MPC | 550 | 89 |
| 1 | 675 | Al. Ch. | Rev. | 550 | 65 |
| 2 | 600 | Al. Ch. | Mill | 600 | 300/600 |
| 1 | 500 | Whse. | Rev. | 250 | 285/700 |
| 1 | 350 | G.E. | CD 169A | 230 | 1150 |
| 1 | 300 | Whse. | Mill | 230 | 300 |
| 2 | 275 | Whse. | Mill | 230 | 425/850 |
| 1 | 220/250 | El. Dy. | Ped. Brg. | 230 | 400/1200 |
| 1 | 180 | G.E. | MPC | 230 | 400 |
| 1 | 175 | G.E. | CD 175A | 230 | 850/1025 |
| 1 | 150 | Whse. | SK 203 | 230 | 300/900 |
| 2 | 125 | Whse. | SK 184 | 230 | 575/850 |
| 1 | 125 | G.E. | MPC | 230 | 400/600 |
| 1 | 100 | El. Dy. | 30 S | 230 | 450/1350 |
| 1 | 80 | Rel. | 651 T | 230 | 575/1150 |
| 2 | 75 | Whse. | SK | 230 | 250/1000 |
| 1 | 60/80 | El. Dy. | 25 S | 230 | 525/1050 |
| 1 | 50 | Whse. | SK 141 | 230 | 250/1000 |
| 1 | 35 | Whse. | SK | 230 | 250/1000 |
| 2 | 30/40 | Whse. | SK 143 | 230 | 500/1500 |
| 1 | 20/25 | Whse. | SK 121 | 230 | 200/1200 |
| 3 | 5/7½ | Rel. | TEFC | 230 | 337/1350 |

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3" bar Universal Tri-Way horizontal, table type, (2), one late.
**GRINDING MACHINES**
72" Hanchett 3-spd. rotary surface, new 1946.
14" x 36" Pratt & Whitney hyd. vert. surface, 1942.
No. 74 Heald hyd. pl. internal, X-sliding H. S., 1941.
16" x 36" Landis type C hyd. pl. cylindrical, 1942.
**HAMMERS**
No. 3C Chambersburg pneumatic, serial No. 2297.
No. 6-1 Nazel, pneumatic, late.
No. 6B Nazel, self-contained.
**LATHES**
No. 3 Gisholt Univ. Turret Lathes (2), 1942.
No. 5 Gisholt ram type Univ. Turret Lathe, 1940.
15" x 30" Lipe Carbo-Matic, 1942.
126" x 96" DC Niles Bement Pond engine lathe, 80 HP, M.D.
**MILLING MACHINES**
No. 2 Brown & Sharpe vertical mill, new 1943.
No. 5-48 Cincinnati hydromatic duplex mill, serial 3B51DIK-5.
No. 2-24 Cincinati automatic simplex mill, serial No. 1B3P1T-1.
**PRESSES**
200 ton No. 7-72 Bliss S.S. D.C. Press, Air Clutch.
350 ton Elmes self-cont. 4-post Hydraulic Press, 1944.
500 ton No. 1039 Hamilton D.C. adj. bed. 60"x102".
800 ton Model 2E-48-800 Hamilton, S.S. air clutch, new 1947.
2000 ton No. 6 National Maxipress Forging Press.
**SHAPERS & SLOTTERS**
32" G & E Invincible, F.M.D.
36" Rockford hyd. vertical slotter, new 1944.
**UPSETTERS**
1½" National Upsetter, guided ram, hard ways.
3" Ajax upsetting & forging machine, air clutch, serial 3614.
3" National high duty forging machine, serial 14196.
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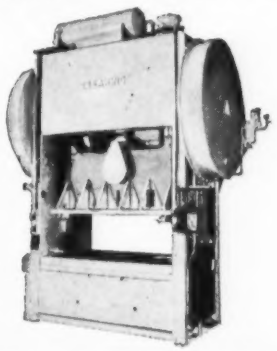

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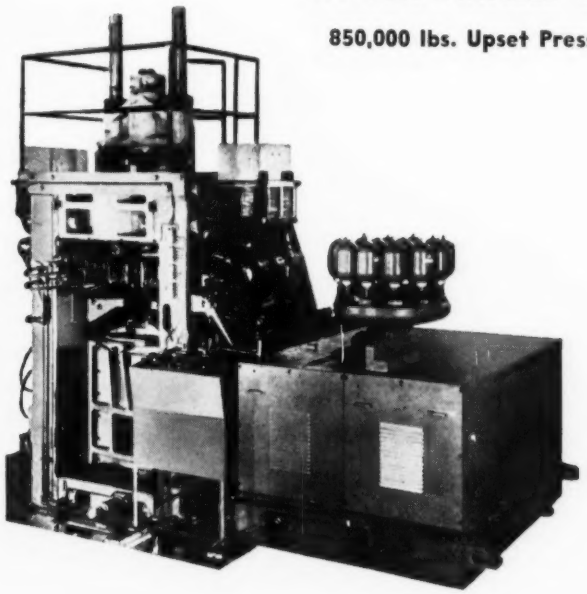

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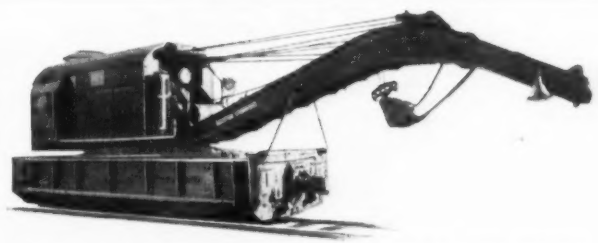

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WELDING ENGINEER—Graduate engineer. Minimum of three years' shop experience. Must know automatic welding processes and equipment. Excellent opportunity for young, aggressive individual. Location, Philadelphia area. Reply with resume and salary expected. Address Box G-478, care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39.

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WANTED—POSITION AS ROLL TURNER in steel rolling plant, having 9", 10" or 12" mills. Have had plenty of experience on merchant mills and shape work. If interested please send replies to Box G-481, care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39.

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## METALWORKING BRIEFS

### Enough Steel for Road Program

The director of the American Institute of Steel Construction believes there should be enough fabricated steel available to carry out the 13-year Federal highway program. Einor T. Blix expressed "confidence" in the steel supply to the Senate subcommittee on roads at hearings on the progress of the highway program.

### Gordon Gray Will Head ODM

Gordon Gray, Secretary of the Army under former President Harry Truman, will replace Arthur S. Flemming as director of the Office of Defense Mobilization. Mr. Flemming has headed the agency since it was formed in 1953. Mr. Gray was called back to government in 1955 by President Eisenhower as Assistant Secretary of Defense for Internal Security affairs. As head of the agency, he will run such groups as the National Security Council and the Defense Mobilization Board.

### Reds Locate Large Ore Deposits

Radio Moscow says the two largest deposits of iron in the world have been discovered in Russia. The broadcast says the deposits are near Belgorod, on the upper Donets river near Kharkov. One deposit is three mi. long, 3000 ft wide, up to 600 ft thick.

### ECSC Output Sets Record High

Production of coal, iron ore and steel in the European Coal and Steel Community reached record levels in 1956. Tentative figures show steel production at 56,720,000 metric tons (approximately 62,522,046 short tons), an increase of about 8 pct over the previous year. Coal production rose by 1.1 pct to 248,992,000 metric tons.

### A Record for Structural Steel

Shipments of heavy structural steel shapes are believed to have set a record in 1956, according to estimates of the American Iron & Steel Institute. Shipments total about 5.3 million net tons, based on figures for the first 11 months.

### Westinghouse Made Comeback In 1956

Westinghouse Electric Corp. came through 1956 with earnings estimated at $3,492,000, despite a five-month strike which ended March 21. The amount is equal to about 10¢ per common share. Gwilym A. Price, president and chairman, said 1956 earnings would have been over $15.5 million, or 82¢ a share, if the LIFO tax accounting method hadn't been adopted to strengthen cash reserves. In 1955 the company's net was $42.8 millon, or $4.78 a share.

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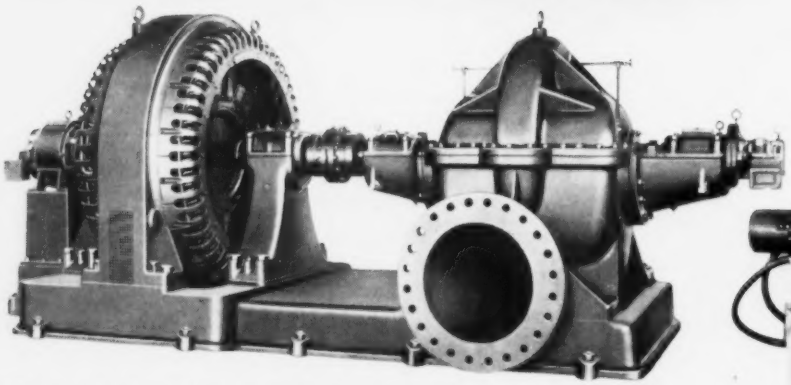

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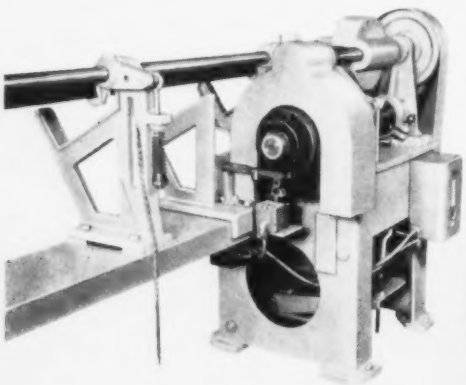

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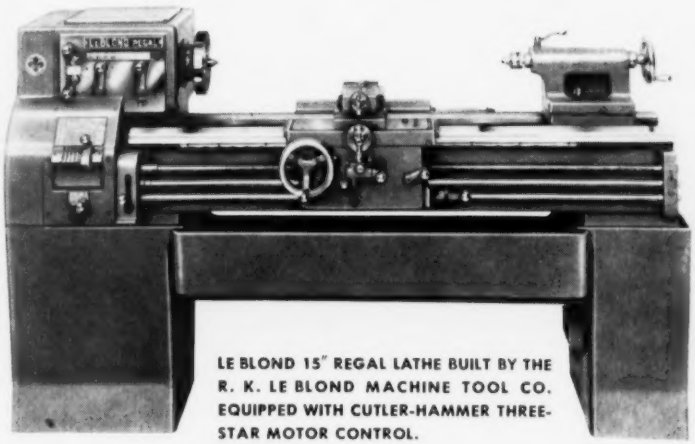

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